National Park Service
U.S. Department of the Interior

Saguaro National Park
Arizona

Saguaro National Park
Fire Management Plan

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7/13/07

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Chapter I: Introduction

Saguaro National Park is located in south- central Arizona and contains 91,327 acres in two units that lie on either side of metropolitan Tucson. The Rincon Mountain District (RMD) is on the east side and the Tucson Mountain District (TMD) is on the west side of Tucson (Figure I- 1). The park was established as a monument in 1933 and upgraded to a park in 1994. Further details on the establishment of the park can be found in Chapter II under "Enabling Legislation and Purpose of the Unit."

Rationale for this Fire Management Plan

The National Park Service Director's Orders #18: Wildland Fire Management (DO- 18) (NPS 1998) requires that: "Park fire management programs will be designed to meet resource management objectives prescribed for the various areas of the park and to ensure that firefighter and public safety are not compromised. Each park with vegetation capable of burning will prepare a fire management plan to guide a fire management program that is responsive to the park's natural and cultural resource objectives and to safety considerations for park visitors, employees, and developed facilities."

Fire played a dominant role in pre- settlement forests of Arizona. During this time, forest ecology was shaped by, and ecosystem health depended on, fire. Pre- settlement fires in many ecosystems frequently spread over large areas in the abundant grass that so impressed early explorers and settlers. As settlement began, large numbers of grazing livestock utilized much of each year's grass production, leaving little fuel to carry fire. As early settlers built homes and began working in forest environments, they found fire a threat to their livelihood and homes. Thus, beginning around the turn of the 20th century, fire was suppressed.

In 1971 Saguaro National Monument developed its first Fire Management Plan (FMP) introduced as Management Appendix 1 of the Natural Resources Management Plan. The FMP was updated in 1979, 1983, and 1991. The 1979 FMP allowed lightning fires to burn within determined areas under certain conditions. A 1983 interim FMP further stated that lightning activity is natural and fires resulting from such activity should be allowed to occur without intervention from humans. This interim plan set the stage for development of criteria for natural fire management. The 1991 plan addressed the effects of fire on all biotic communities of the park, from the desert to the montane ecosystems. The 1991 plan also based fire management units on "natural" fuel loadings, natural vegetative associations, and fire control needs. A third part of this plan was a literature review of known fire effects on natural communities found in the park. Furthermore, it was the intent of this plan to consolidate all the data relating to fire management at Saguaro National Park into one document.

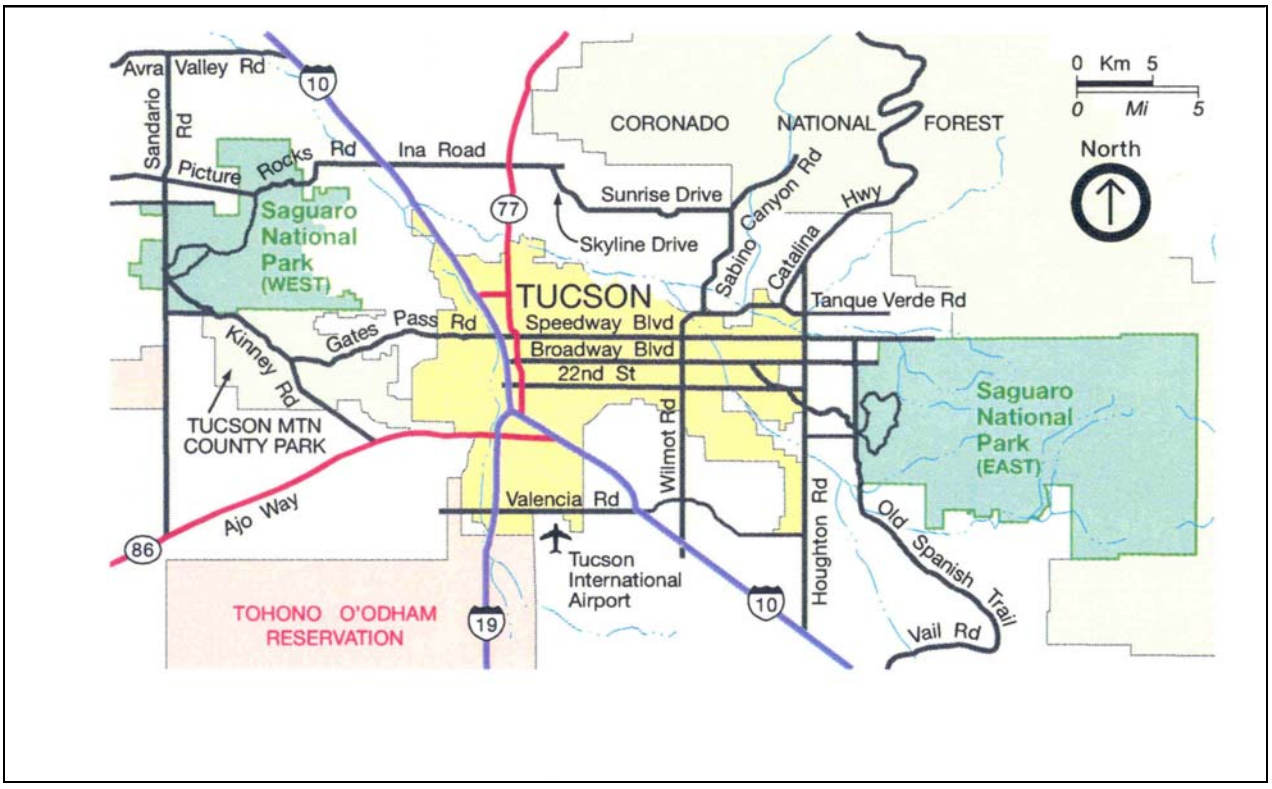

Figure I- 1. Saguaro National Park East and West

This 2004 FMP updates the 1991 plan with new information about park resources. It uses this information to help achieve management objectives as well as to stay current with new fire management policies

Collaborative processes and opportunities

Collaborative processes were used to develop the underlying land management plan direction and the fire management plan. Saguaro is a member of the Southeast Arizona Zone in addition to United States Forest Service–Coronado National Forest (USFS), Bureau of Land Management – Safford District (BLM), United States Fish & Wildlife Service– Buenos Aires and San Bernardino national wildlife refuges (USFWS), Bureau of Indian Affairs – Tohono O'odham and San Carlos, State of Arizona – Tucson Office, and numerous local fire departments.

Saguaro works most closely with the Coronado National Forest due to the common boundary on the east side (Rincon Mountain District) of the park. Key contacts for the management of the fire programs in both agencies are listed in Chapter V.

Policies

NPS fire management activities will be performed in accordance with the principles, policies, and recommendations of the Final Report of the Federal Wildland Fire Management Policy and Program Review, and with Part 620 of the Departmental Manual. Air operations during wildland fire incidents will comply with the provisions of Director's Order #60 (Aviation Management) and Parts 350- 354 of the Departmental Manual. The plan will implement fire management policies and help achieve resource management and fire management goals as defined in (1) Federal Wildland Fire Management Policy and Program Review, (2) Managing Impacts of Wildfires on Communities and the Environment, and Protecting People and Sustaining Resources in Fire Adapted Ecosystems- A Cohesive Strategy (USDOI/USDA) and (3) A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: 10-Year Comprehensive Strategy Implementation Plan.

All naturally caused wildland fires may be managed to accomplish resource management goals, provided there is an approved fire management plan, and provided they do not compromise firefighter and public safety, threaten property, or violate air quality laws or regulations.

The Associate Director for Park Operations and Education has issued Reference Manual Eighteen (RM- 18) to help NPS managers and field staff understand and implement Departmental and NPS policies applicable to fire management. The reference manual contains detailed procedures emphasizing personnel safety, the use of wildland fire for beneficial purposes, monitoring of smoke behavior, and the concept of risk management.

The superintendent of each park having burnable vegetation will ensure RM- 18 is available in sufficient quantities to serve the needs of fire management staff within the park, and will ensure that fire management staff is adequately versed in the Departmental and NPS policies and procedures contained therein.

Within the text of this document is an application of national policy at Saguaro National Park. Interested parties should review these contents within the context of the National Park Service Organic Act (16 USC 1) and the proclamation that established the park. The Organic Act directs the NPS "to promote and regulate the use of...national parks, parks, and reservations...." Its purpose is to both conserve the scenery and natural and historic objects, and provide for the enjoyment of the people in such a manner as will leave them unimpaired for succeeding generations. The proclamation (No. 2032) of March 1, 1933 dictated that Saguaro National Monument be set aside in order to protect various species of cacti and their associated desert ecosystems while providing for visitor health and safety. Therefore, fire management strategies presented in this plan were selected based upon the need to preserve natural processes in harmony with the public's demand for recreation.

This plan meets the requirements that have been set forth within the Departmental Manual 9101.1, DO- 18, RM - 18, the "Report on Fire Management Policy" of December 14, 1988, and the “Federal 2001 Federal Wildland Fire Management Policy.”

Compliance

An interdisciplinary team prepared an Environmental Impact Statement (EIS) (Appendix II) for this plan to comply with the National Environmental Policy Act (NEPA). The team, composed of managers and subject matter experts, gathered information, developed alternatives, prepared the draft and final documents, and involved the public and other agencies to carry out the compliance process. Chapter XII lists the team members. Archeologists of the Western Archeological and Conservation Center and of the Southern Arizona Group Office, National Park Service (NPS) addressed National Historical Preservation Act (NHPA) requirements. Additional review was requested from the Arizona State Historic Preservation Office. The NHPA Assessment of Effects is included with the EIS. The interdisciplinary team also prepared a Biological Assessment (BA) for the USFWS that began a formal consultation on listed species.

Authorities

The authority for fire management is established in the “conserve” clause of the National Park Service Organic Act (Act of August 25, 1916), which states the following purpose of the agency:

“The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified, except such as are under the jurisdiction of the Secretary of the Army, as provided by law, by

such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations. "

The authority was further clarified in the National Parks and Recreation Act of 1978:

"Congress declares that . . . these areas, though distinct in character, are united . . . into one National Park System. The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

Further authorities and guidelines for implementing this plan are contained in:

- Departmental Manual (910 DM)
- Federal Wildland Fire Management Policy (1995) Review and Update (National Interagency Fire Center 2001)
- Interagency Federal Wildland Fire Management Policy and Review (1995)
- National Fire Plan (2001)
- Statement for Management (NPS 1987)
- Wildland Fire Management (NPS 1990)

Chapter II: Relationship to Land Management Planning and Fire Policy

This chapter identifies for fire managers the direction found in land and resource management planning documents, including the General Management Plan (GMP), Wilderness Management Plan, and the Natural and Cultural Resource Management Plan, specifying goals, objectives, and desired future conditions as they pertain to fire management activities.

NPS Management Policies

To implement NPS Management Policies governing fire management, the NPS will administer its wildland fire program in a manner that will:

- Achieve maximum overall benefits and minimize damages of wildland fire use within the framework of land use objectives and resource management plans, while giving primary consideration to firefighter and public safety.
- Educate employees and the public about the scope and effect of wildland fire management, including fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
- Stabilize and prevent further degradation of natural and cultural resources lost in and/or damaged by impacts of wildland fires and/or fire management activities.
- Maintain the highest standards of professional and technical expertise in planning and safely implement an effective wildland fire management program.
- Integrate fire management with all other aspects of park management.
- Manage wildland fire incidents in accordance with accepted interagency standards, using appropriate management strategies and tactics, and maximize efficiencies realized through interagency coordination and cooperation.
- Scientifically manage wildland fire using best available technology as an essential ecological process to restore, preserve, or maintain ecosystems and use resource information gained through inventory and monitoring to evaluate and improve the program.
- Protect life and property and accomplish resource management objectives, including restoration of the natural role of fire in fire- dependent ecosystems.
- Effectively integrate the preservation of wilderness including the application of "minimum requirement" management techniques into all activities impacting this resource.

Enabling Legislation and Purpose of the Unit

The portion of Saguaro National Park now known as the RMD was established as a national monument by presidential proclamation (no. 2032) on March 1, 1933. This proclamation states that the purpose of "reserving [the] land…as a national monument" was to preserve and protect "…the exceptional growth thereon of various species of

cacti, including the so- called giant [saguaro] cactus". On November 15, 1961, Presidential Proclamation No. 3439 added lands in the Tucson Mountains to the Monument. A first enlargement of the TMD occurred on October 21, 1976 (PL 94- 578). Preservation of wilderness values was legislatively mandated on October 20, 1976 (PL 94- 576), when 13,470 acres in the TMD and 57,930 acres in the RMD were formally designated as wilderness in accordance with the provisions of the Wilderness Act. In 1994, legislation (PL 103- 364) was signed into law, which enlarged the boundaries of the monument and upgraded Saguaro from a national monument to a national park.

The significance of the park lies in the rich diversity of Sonoran Desert life found within a framework of historic and prehistoric human occupation. The purpose must be to assure that these natural and cultural resources shall be managed in such a manner as will leave them unimpaired for the enjoyment of future generations.

Significant Resources and Values
Saguaro National Park manages territory in the "sky island" region of southern Arizona. Significant resources include rugged topography, visible and varied geology, clear skies, extensive wilderness, diverse habitats, rich biota, important cultural sites, and over 160 miles of trails combined for both districts. The TMD ranges from an elevation of 2,180 ft to 4,687 ft and contains desert scrub and desert grassland biotic communities. The RMD ranges from 2,670 ft to 8,666 ft and contains six biotic communities: desert scrub, desert grassland, oak woodland, pine- oak woodland, pine forest and mixed conifer forest. The signature saguaro cactus occurs throughout the TMD and within the lower elevations of the RMD. Given the park's proximity to the growing Tucson metropolitan area, its 71,400- acres (includes both districts) of designated wilderness is an especially valued feature; Figures II- 1 and II- 2 depict the wilderness areas of the two units as designated by Public Law 94- 567 (10/20/76).

Desired Conditions and GMP Fire Goals and Objectives

The current GMP does not contain specific objectives pertaining to fire. The park will continue to develop a range of desired conditions as it completes a new GMP (working on it 2003- 2005).

Natural/Cultural Resource Management Plan Fire Objectives

This FMP (2004) is an operational plan under the Natural/Cultural Resource Management Plan (NCRMP). Management and research proposals in the NCRMP are consistent with the enabling legislation for the park, the Wilderness Designation of Public Law 94- 567 and Title 36, Code of Federal Regulations. The NCRMP is designed to provide a systematic method of documenting environmental impacts and developing action plans so management can mitigate or eliminate negative human impacts on natural and cultural resources. The primary goal of the natural resources management program for Saguaro National Park is to protect naturally evolving biotic communities and landscapes; some of which have had human influences imposed on the natural processes of ecological evolution.

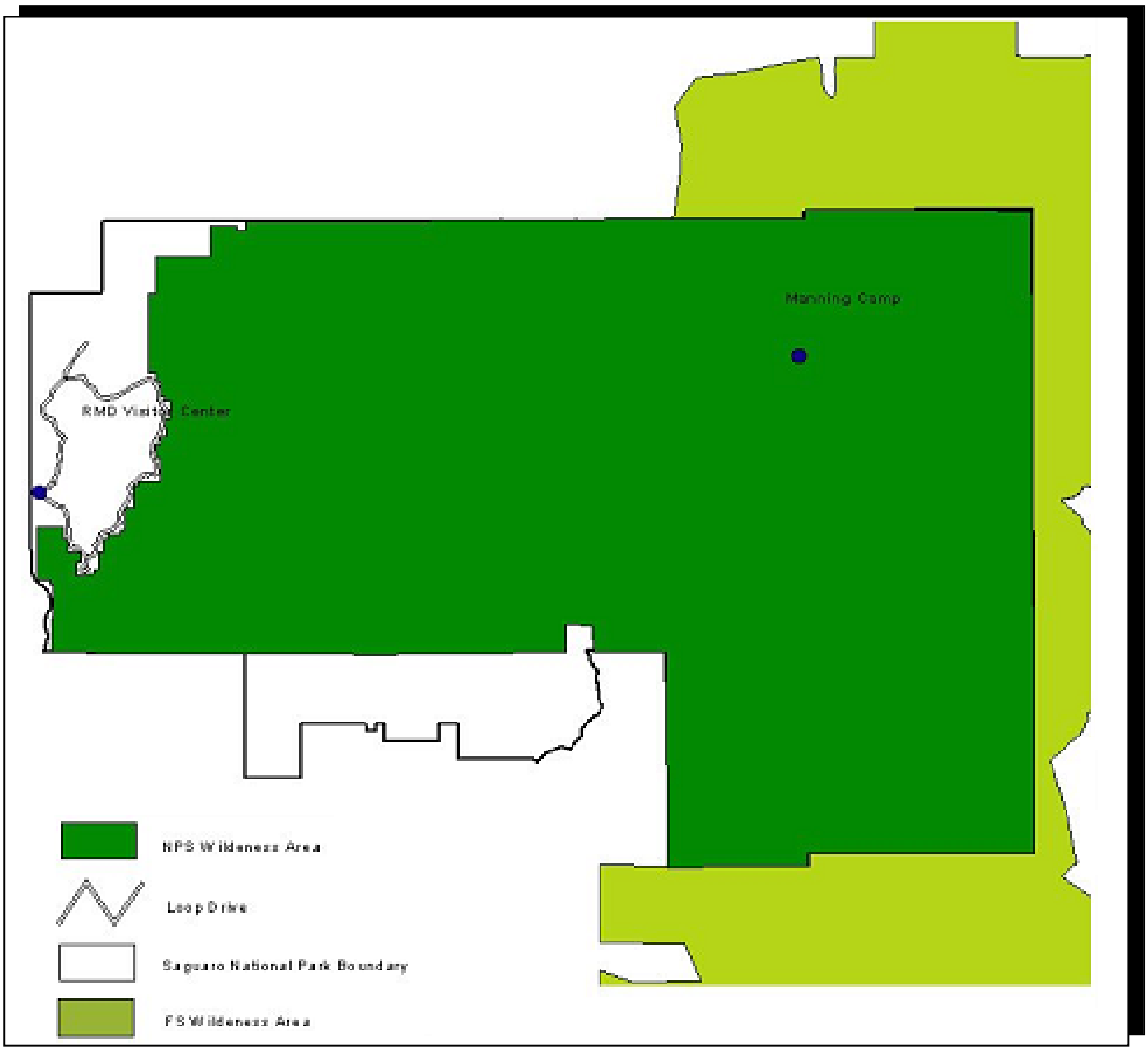

Figure II- 1. Designated Wilderness Areas of Saguaro National Park, Rincon Mountain District and adjacent USFS Wilderness

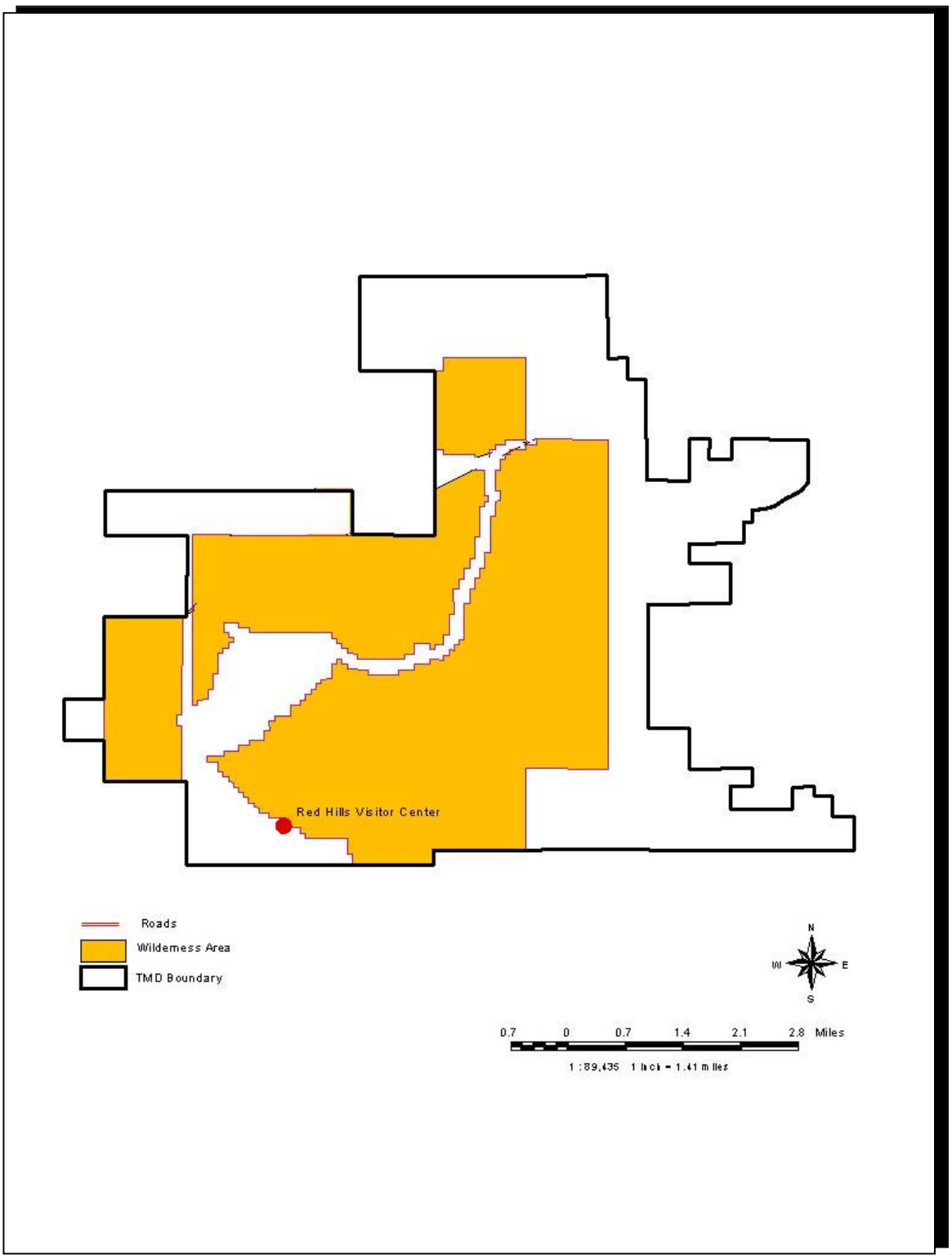

Figure II- 2. Designated Wilderness Areas of Saguaro National Park, Tucson Mountain District

The current NCRMP objectives that pertain to fire are:

- Conduct an active fire management program in the park.
- Ensure the perpetuation of native species and suppression of non- native species through the preservation of ecological processes.
- Manage resources based on data gathered through active research programs in the natural, cultural, and social sciences.
- Preserve and protect prehistoric and historic structures.

This FMP is a detailed program of action to carry out the above objectives. Specific FMP goals and objectives are discussed in Chapter III.

Chapter III: Wildland Fire Management Strategies

General Management Considerations

The presence and importance of fire within woodland communities have been noted for decades (Leopold 1924; LeSueur 1945; Wallmo 1955; Marshall 1957, 1963; Niering and Lowe 1984). While surveying birds in the Mexican pine- oak woodlands, Marshall (1963) noticed that in Mexico, where fire suppression was minimal, the woodlands were open with a dense grass understory. Across the border in the United States where land managers suppressed fire, Marshall saw stunted woodlands with much accumulated fuel and little grass understory. Fires in this situation were often severe and killed most of the overstory trees and understory plants. Escobedo et al. (2001) documented heavier loadings of downed woody fuels on pine- oak forest sites in southeastern Arizona compared with northeastern Sonora, Mexico.

The basic objectives of the management policies at Saguaro National Park are the protection and perpetuation of naturally operating ecosystems to the fullest extent consistent with safeguarding public safety, cultural resources and private property. Fire is a natural process in these ecosystems, and consequently fire must be managed so that it can assume its natural role, either as wildland fire use or through prescribed burning. Management ignited prescribed fire will be used to re- establish the natural influence of fire and restore natural fuel loadings through the reduction of hazardous fuel accumulation. All projects that include prescribed burning will include specific burning prescriptions that will insure the fire can be controlled within established boundaries and that the burning will meet the desired fire management objectives for the resource.

Wildland Fire Management Goals

The fire management program goal is to effectively manage wildland and prescribed fire and provide for the protection of life, property, and cultural resources, while insuring the perpetuation of park ecosystems and natural resources. Specific goals and objectives developed by the IDT appear in Chapter II under "FMP Goals and Objectives."

These goals contribute to accomplishing regional and national strategic plans such as the 10- Year Comprehensive Strategy and NPS Strategic Plan, as well as wildland fire policy. Fire program goals reflect federal fire policy, the core principles and goals of the Comprehensive Strategy, and the Cohesive Strategy where supported by land and resource management plans.

The interdisciplinary team overseeing the writing of the present plan and compliance documents developed the following goals and objectives for the Saguaro National Park fire program that are compatible with and assist fulfillment of NCRMP objectives.

- Give primary consideration to firefighter, employee, and public safety.

- Manage fire to minimize threats of unacceptable effects of fire to property outside the park and sensitive cultural and natural resources.
  - Identify and map county, state, federal, and private lands within one mile of the park's designated boundary as well as sensitive cultural and natural resources within the park boundaries, which if fire were to burn into, could be negatively impacted.
- Restore and maintain fire- adapted ecosystems through the ecologically appropriate use of fire.
  - Continue to develop a range of desired conditions as well as ecologically sound objectives for the fire program in the different vegetative communities in the park using the best available scientific data.
  - Include established ecological objectives in each prescribed fire burn plan.
- Utilize research and monitoring to improve our understanding of the role of fire in the park's vegetative communities.
  - Adapt protocols utilizing the Fire Monitoring Handbook that will ensure fire effects are tracked for all prescribed fire use in the park.
  - Develop an appropriate monitoring plan for each prescribed fire or wildland fire for resource benefit
  - Prepare and present an annual report of data and effects to measure how well fire management objectives were met (done by the Fire Ecologist and/or Lead Fire Effects Monitor).
  - Recognize and address knowledge gaps through research studies.
- Integrate fire management with all other aspects of park management.
  - Conduct biannual briefing (pre- and post- fire season) with interested park staff and interagency cooperators (done by Division of Fire and Aviation).
  - Insure that collaborative planning among park staff is provided during any prescribed and wildland fire projects.
  - Insure that fire activities in the park are directed by the Fire Management Committee under direction of the Superintendent and the Fire Management Officer (FMO).
- Educate employees and the public about the scope and effect of wildland and prescribed fire management, including fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
  - Establish a fire information organization appropriate for each wildland or prescribed fire operation.
  - Work with the Division of Interpretation to integrate fire management issues and objectives into the park's Interpretive Plan.
- Maintain cooperative planning with other land agencies and landowners.
  - Develop cross boundary prescribed fire projects as conditions permit.
  - Inform and involve these groups at the appropriate level in major planning efforts.
- Protect sensitive cultural resources.
  - Work with NPS Cultural Resource staff to ensure the protection of sensitive cultural resources.

Wildland Fire Management Options

Four fire management strategies are employed under this plan:

Wildland Fire Suppression

Wildland fire suppression (appropriate management response) will be utilized in areas of the park when or where the implementation of a wildland fire use for resource benefit strategy is unacceptable.

Prescribed Fire

- Hazard Fuel Reduction: Prescribed fire projects for reduction of hazard fuel conditions will be used in areas that threaten values- to- be- protected, sensitive species, and specific ecosystems. The long- range objective of this program is to reduce wildland fire hazard to levels that enable wildland fires to be managed in as natural a state as possible.

- Ecosystem Management: Prescribed fire will be used in support of ecosystem management to maintain and/or restore plant communities by restoring fire as an ecological process and promoting the biotic cycling that fire sets into motion.

Wildland Fire Use

Wildland fire use will be utilized to the maximum extent possible in the park. Wildland fire use allows naturally ignited wildland fires to burn as long as they meet pre- stated resource management objectives within the maximum manageable area (MMA) and prescriptive parameters are not exceeded. An ongoing or potential "wildland fire use" fire that does not meet predetermined prescriptive elements or fails to meet resource management objectives will be suppressed using an appropriate management response. Current policy allows management for resource benefits on portions of a fire perimeter, while other portions of the perimeter on the same fire are managed with an appropriate management response.

Non- Fire Applications

Non- fire treatments of fuels, which at Saguaro mainly include thinning and herbicide application, will have a limited role and be used primarily around structures. In addition, thinning may be used to prepare burn units where quantities and arrangements of fuels create unsafe conditions.

Park- wide Abiotic and Biotic Environment

Park- wide features that affect fire management are presented below.

Geology

The granites that make up the Rincon Mountains have been altered to rocks called mylonite and cataclasite. Rocks that make up the relatively level land along the margins of the Rincon Mountains are mainly limestone and schist.

The Tucson Mountains are a typical example of the Basin and Range Province. Wasson and Amole Peaks are formed from granite. Volcanic rocks, such as rhyolite, andesite and basalt, are also evident. Cat Mountain rhyolite forms the top- most layer of the Tucson Mountains.

Hydrology
Watersheds in the park are generally small with first, second, and third order drainages (Mott 1997). In TMD, these drainages are strictly ephemeral, flowing primarily in response to summer "monsoon" storms that bring brief but substantial precipitation and flash flooding. Winter precipitation tends to be gentler and longer in duration; this rainfall better infiltrates the soil with minimal surface flow. No perennial water or wetlands are present in the district; however, a few small natural and man- made water sources occur, one being in King Canyon. Additionally, three windmills provide supplemental water for wildlife, drawing water from wells into man- made catchments.

RMD has much higher elevation watersheds that reach over 8,000 ft compared to TMD whose highest peak is 4,700 ft. Like the TMD, annual rainfall in the lower elevations averages 11in, but annual precipitation near the mountain peak can exceed 30 in where snow pack can be heavy in the winter months. In average years, snowmelt in winter and spring leads to the majority of the annual surface flow. Summer conditions are similar to TMD, where surface flow occurs exclusively after large storm events. Streams are perennially interrupted, intermittent or ephemeral, and pools of water often remain year round. Several springs and seeps occur through the upper elevations.

Soils
Because of the semi- arid climate, soils are not well developed at Saguaro. The ground surface for most of the Rincon Mountains consists of bedrock or regolith. A thin veneer of alluvium covers pediment surfaces along the margins of the range. This alluvial fill thickens to tens of feet along larger drainages, such as Rincon Creek, and has been cut into terraces by stream entrenchment in places. Aridisols with calcium carbonate (caliche) concentrations have developed on this deeper alluvium. At the highest elevations, where the natural vegetation is coniferous forest, thin soils with distinctive soil horizons have developed. The soils of the TMD mountain slopes are shallow, coarsely textured and well- drained, and soils of the *bajadas* are alluvial (NPS 1995). Soils become progressively finer with more sand and clay from bedrock to bajada to flats. Granite weathers rapidly into gruss forming "plant friendly" soils.

Air Quality
By virtue of its 1976 wilderness designation, Saguaro National Park is officially designated a Class I airshed under the Clean Air Act Amendments of 1977. Preventing deterioration of air quality in this area, however, is a difficult challenge because of the adjoining Tucson metropolitan area, which significantly impacts air quality throughout the park's airshed. Smoke from park fires has the potential to impact Tucson. Close coordination with state air quality authorities on wildland fire use and prescribed fires

can help minimize impacts.

Vegetation
Table III- 1 lists the major vegetation types for the park, where they are found, and the major species involved. Fire- adapted grasslands, woodlands, and forests encompass approximately 47,000 acres of the 91,327- acre park, countering the popular perception of the place as mostly desert. Vegetation communities are discussed in more detail under the FMU headings where they are relevant.

Wildlife
The park's RMD lies at the interface of the Sonoran and Chihuahuan deserts, and is part of the "sky- island" chain of scattered mountaintops in southeastern Arizona, which connect the Rocky Mountains to the north and Mexico's Sierra Madre Occidental to the south. Faunal elements from each of these biomes are represented in the Rincon Mountains. In addition, the districts elevation ranges from 2,700- 8,666 ft, and encompasses the life zones represented in Table III- 1; desertscrub to mixed conifer forests. The San Pedro River, just east of the RMD, and the major drainages of the Rincon Mountains add riparian components to the faunal diversity, as well as provide wildlife movement corridors between mountain ranges through the surrounding desertlands. Overall, the park supports thousands of invertebrates, and over 325 vertebrates, including about 70 mammals, 200 birds, 50 reptiles, and 8 amphibians. Table III- 2 lists some vertebrate species of interest in the park. The challenge in maintaining this biodiversity while bringing potentially destructive fire back into the system is underscored by the fact that since the turn of the last century, desert bighorn, Mexican wolves, jaguars, grizzly bears and the Gila topminnow have been extirpated from the RMD.

The fauna of the TMD is similar to wildlife in the lower elevations of the RMD. However, the TMD is lower, flatter and sandier than the RMD, and contains some faunal elements associated with the Lower Colorado subdivision of the Sonoran desert, such as kit fox, desert iguana and sidewinders. The TMD and adjacent Tucson Mountain Park are increasingly surrounded by urbanization and development. Insularization is a threat to the long- term viability of larger terrestrial vertebrate populations in this district, which has already lost desert bighorn and white- tailed deer.

While fire can cause death and injury to wildlife in the short term, it renews fire-adapted habitats, creates edges, and can increase forage. Where possible, the fire program will mitigate the effects of fire on wildlife species. Rare and protected species are considered separately in Chapter X.

Cultural Resources
Archeological Resources. A combination of intensive and reconnaissance archeological surveys has provided a good understanding of the location of archeological sites in Saguaro National Park. Prehistoric sites include camps, villages, agricultural sites, quarries, rock art sites, and rock shelters. These resources are generally found in FMU 2

Table III- 1. Saguaro National Park Vegetation Communities

Vegetation		Elevation & Fire Management Unit	Predominant Species
Desert Scrub	RMD	Mountain base (about 3,500 ft) to 5,200 ft / FMU 1 & 2	Creosote, palo verde, saguaro, prickly pear, catclaw, ocotillo, ironwood, mesquite
	TMD	2,133 – 4,757 ft / FMU 2	
Desert Riparian Scrub		Lower elevation floodplains and drainages / FMU 2	Velvet mesquite, spiny hackberry, catclaw acacia, paloverde
Desert Grassland	RMD	4,500 – 6,100 ft / FMU 1	Mesquite, beargrass, grama grasses, Arizona rosewood, agaves, sotol, desert- willow, ocotillo, cholla
	TMD	3,691 – 4,692 ft / FMU 2	
Pine- Oak Forest/Woodland/Pine Forest Occurs in RMD only.	Pine- Oak Woodland	5,500 – 7,000 ft / FMU 1	Alligator juniper, Mexican pinyon, Arizona white oak, Emory oak, manzanita, prickly pear, *Muhlenbergia* spp.
	Pine- Oak Forest	5,300 – 8,000 ft / FMU 1	Chihuahuan pine, Mexican Pinyon pine, ponderosa pine, netleaf oak, alligator juniper, silverleaf oak
Mixed Conifer Occurs in RMD only.	Pine Forest	7,600 – 8,666+ ft / FMU 1	Ponderosa pine, Gamble oak, southwestern white pine, rockspirea, screwleaf muhly
	Mixed Conifer Forest	7,001 – 8,666 ft / FMU 1	Douglas fir, ponderosa pine, Mexican pinyon pine, Gambel oak, white fir, common hoptree,
Mountain Wet Meadow		7,402 – 8,666 ft / FMU 1	Cyperaceae (sedges), Poaceae (grasses), Juncaceae (rushes)
Mountain Dry Meadow		8,497 ft / FMU 1	Muhly grasses, bentgrass, dropseed, needlegrass, bracken fern
Riparian Woodland/ Riparian Forest		Various elevations / FMU 1 & 2	Arizona alder, boxelder, willow, Arizona walnut, Alligator juniper, cottonwood

Table III- 2. Wildlife Species of Interest in Saguaro National Park

Area	FMU	Common Name	Scientific Name
RMD High Country (>6,000 ft)	FMU 1	Mammals	
		Black bear	*Ursus americanus*
		White- tailed deer	*Odocoileus virginianus*
		Porcupine	*Erethizon dorsatum*
		Eastern cottontail	*Sylvilagus floridanus*
		Birds	
		Mexican spotted owl	*Strix occidentalis*
		Northern goshawk	*Accipiter gentilis*
		Zone- tailed hawk	*Buteo albonotatus*
		Reptiles	
		Arizona black rattlesnake	*Crotalus viridis cerberus*
RMD and TMD Riparian Corridors (various elevations)		Mammals	
		Mountain lion	*Felis concolor*
		Bobcat	*Lynx rufus*
		Birds	
		Gray hawk	*Asturina nitida*
		Yellow- billed cuckoo	*Coccyzus americanus*
		Reptiles	
		Sonoran mud turtle	*Kinosternon flavescens*
		Lowland leopard frog	*Rana yavapaiensis*
		Canyon whiptail	*Aspidoscelis burti*
Desert Scrub (RMD: 3,500 ft to 5,200 ft; TMD: 2,133 ft to 4,757 ft)		Mammals	
		Mule deer	*Odocoileus hemionus*
		Coyote	*Canis latrans*
		Javelina	*Pecari angulatus*
		Birds	
		Golden eagle	*Aquila chrysaetos*
		Roadrunner	*Geococcyx californianus*
		Gambel's quail	*Callipepla gambelii*

		Reptiles	
		Gila monster	*Heloderma suspectum*
		Sonoran desert tortoise	*Gopherus agassizii*
		Western diamond- backed rattlesnake	*Crotalus atrox*
TMD only	**FMU 2**	Mammals	
		Kit fox	*Vulpes macrotis*
		Reptiles	
		Desert iguana	*Dipsosaurus dorsalis*
		Sidewinder	*Crotalus cerastes*

in areas where all fires are suppressed or areas where fires are infrequent and natural.

Historic Resources. There are a number of historic structures and sites in Saguaro National Park. Manning Cabin, at 8,000 ft in the Rincon Mountains, is on the National Register of Historical Places. The Freeman Homestead and the Lime Kilns, also in the RMD, are on the State Register of Historic Places. The distinctive stone masonry seen in the TMD picnic areas and along the roads in both park units is the work of the Civilian Conservation Corps (CCC). Other historic resources include mining and ranching sites as well as historical trash deposits. All identified historic resources are located in fire management units where full protection is assured by fire management practices.

Cultural Landscapes. There are several areas considered to be cultural landscapes in the park. These are listed in the Cultural Resources Matrix found in Chapter IV. Among them is the Rincon Mountain Foothills Archeological District which includes lithic scatters, agricultural sites, and rock art. This area is located in both FMU 1 and 2 and may be effected by fire through direct contact with the flaming front or management activities.

Park- wide Historical Weather Analysis and Fire Season

The Southwest is normally a region of relatively high temperatures, low humidities, light precipitation, and during the spring, moderately strong winds. In Tucson, it is not uncommon to have daytime high temperatures in excess of 105 degrees with humidities below 5%. Saguaro National Park experiences distinct winter and summer rainfall periods, separated by spring and fall droughts usually lasting 60 - 90 days. Rainfall and temperature vary with elevation, and are discussed under each FMU.

Saguaro's fire season follows the pattern of the Southwest and generally begins around the beginning of May. During some abnormally dry years the fire season, at least in Southern Arizona, will begin much earlier. While fuel conditions are receptive for fires in May, it is not generally until mid- June when Saguaro begins to experience significant

thunderstorms with dry lightning – the primary source of fires at the park. Fire occurrence picks up in June with July and August the two top months for fires in the park. Once the monsoon season begins in early July, the severity of the fires drops, picking up again in the form of a short fall season, beginning mid- September with the departure of the monsoon moisture.

Description of Wildland Fire Management Strategies by FMU

Identification of Fire Management Units (FMUs) is the cornerstone for planning the management of the wildland fire program. Each FMU is unique as evidenced by management strategies, objectives and attributes. Detailed descriptions of vegetation and environmental features are presented for each FMU. Abiotic and biotic environment and historical weather analysis and fire season are common to both FMUs and are discussed in the previous section. FMU 1 lies above roughly 4,500 ft (the desertscrub- desert grassland boundary) in the RMD, where fire- adapted grasslands, woodlands, and forests grow at higher elevation (see Table III- 1). FMU 2 encompasses the area below about 4,500 ft in the RMD and the entire TMD. In the RMD, these lands are occupied by desertscrub. In general, managers will encourage fire as a natural process in FMU 1 and keep fire out of FMU 2, where the historical role of fire in desertscrub is not assumed to be great, but is ultimately unknown.

Description of FMU 1

The park's objective for this FMU will be to maximize the use of wildland fire for resource benefit and the application of prescribed fire.

FMU 1 occurs entirely within the Rincon Mountains (Figure III- 1). It is defined, geographically, by two distinct ridgelines. From the toe of Tanque Verde Ridge the unit gains elevation northeast to the high point of 8,666 ft at the top of Mica Mountain, broken only by the descent into Cowhead Saddle about halfway up to Mica Mountain. From Mica Mountain there is a south- southeast ridgeline that drops to Happy Valley Saddle before climbing to the top of Rincon Peak at 8,482 ft. The FMU 1 boundary starts on the north boundary of the park at 110° 35' 40", from that point it follows the 4,800 ft elevation line into Douglas Springs Campground. From the campground the unit boundary follows the Douglas Springs Trail to 110° 38' 46" where the trail intersects the 4,500 ft elevation line. At that point, the boundary follows the 4,500 ft elevation line southwest to Tanque Verde Ridge where the contour turns east and continues along the 4,500 ft line. This contour continues east then turns south, east of Madrona Ranger Station and finally intersects the park boundary and USFS Wilderness in T15S, R17E, the northwest ¼ of the northwest ¼ of the southwest ¼ of section 23 at latitude 32° 06' 38". Boundary areas east of this line are abutted with the Santa Catalina Ranger District, Coronado National Forest that currently allows the co- management of wildland fire use on that portion of the district.

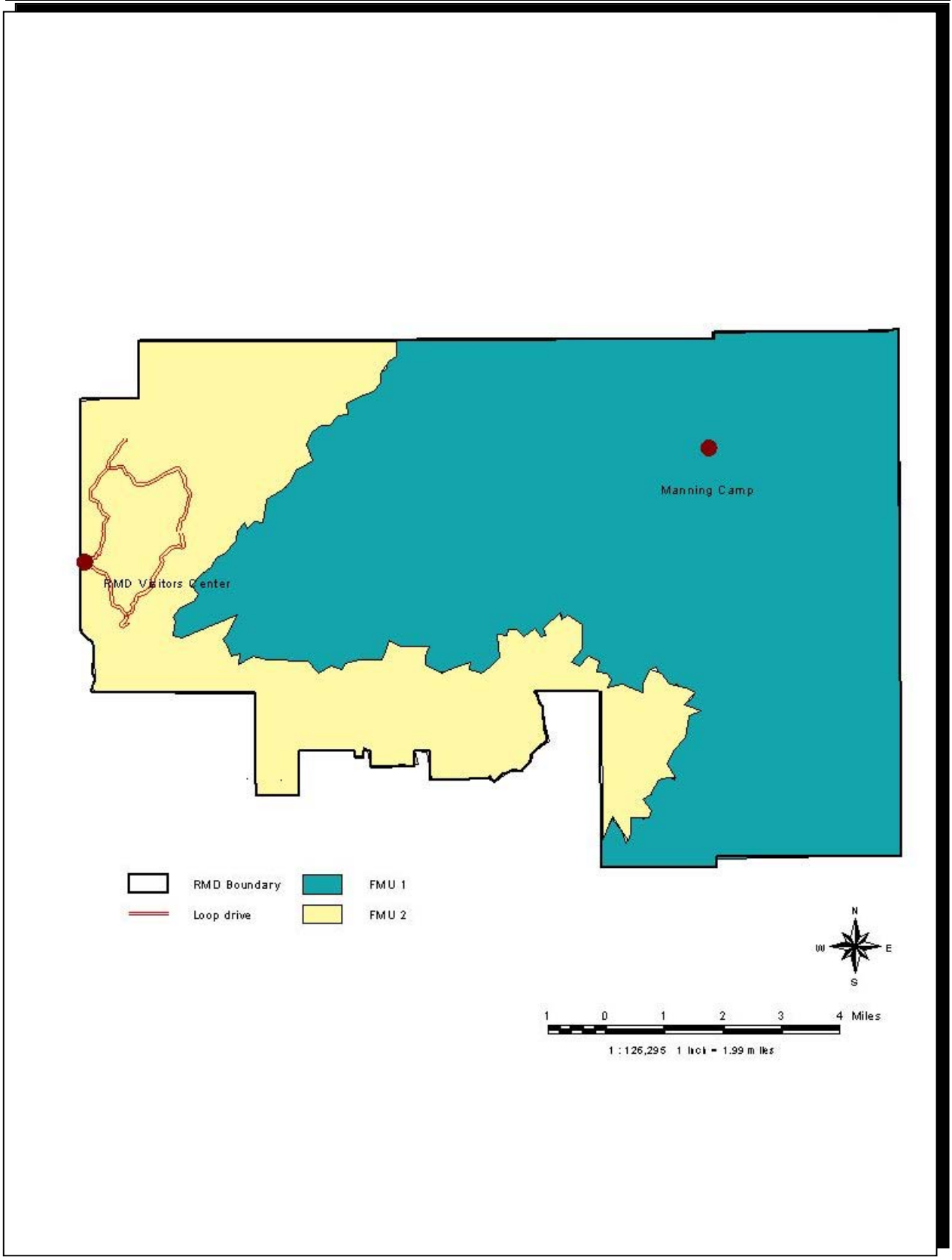

Figure III- 1. FMU 1 and FMU 2 in the Rincon Mountain District

FMU Rainfall and Temperature Data
Table III- 3 represents the monthly rainfall and temperatures found in FMU 1.

FMU 1 Vegetation
As described in Table III- 1, FMU 1 is composed of three major vegetative communities that replace one another along an elevational gradient: mixed conifer (pine and mixed conifer forests), Pine- Oak Forest/Woodland/Pine Forest (pine- oak woodland and forest), and desert grassland. Adjacent associations share many species. Mixed conifer forest occupies small, north- facing slopes at high elevations. Table III- 1 also defines minor vegetative communities including riparian forest and riparian woodland that occur locally in canyon bottoms. In addition, wet and dry meadows are found in scattered clearings at high elevations, the former around springs, the latter often on old burns or disturbed sites (Bowers and McLaughlin 1987).

Mixed Conifer (Fire Management Area A): This area is found above 7,000 ft and encompasses approximately 7,000 acres. Table III- 4 lists NFDRS/Fire Behavior fuel models for Saguaro's vegetation communities (Figure III- 2). Mixed conifer is classified as C/9 or 2 (open pine with grass), U/9 (western long- needle pine), and G/10 (short-needle closed canopy). This area is classified as an appropriate management response area with park policy allowing for the maximum use of wildland fire and prescribed fire. The area includes the mixed conifer and pine forests and lies within the designated wilderness.

Pine- oak Forest/Woodland/Pine Forest (Fire Management Area B): This area contains vegetation described as oak, pine- oak woodland/chaparral, and pine- oak forests occupying an area of approximately 34,000 acres and lies within the designated wilderness. NFDRS/Fire Behavior fuel models R/8 (hardwood litter (summer)) and F/6 (intermediate brush) are representative of the area (Table III- 4). This area is classified as an appropriate management response area with park policy allowing for the use of wildland fire and prescribed fire.

Desert grassland (Fire Management Area C): This vegetation is found between 4,500 and 6,100 ft in the RMD. It occupies an area of approximately 6,000 acres and lies within the designated wilderness. NFDRS/Fire Behavior fuel models A, L, S/1(grass/herbaceous) are representative of the area (Table III- 4). This area is classified as an appropriate management response area with park policy allowing for the use of wildland fire and prescribed fire.

Strategic and Measurable Fire Management Objectives for FMU 1
In FMU 1, the park intends to restore natural fire regimes to 29,000 (50%) of 57,930 acres of the portion of Saguaro's wilderness/backcountry where fires naturally occur by FY 08.

Table III- 3. FMU 1 Monthly and Daily Normal Temperatures (1997- 2003) for Manning Camp, Saguaro National Park, Tucson, Arizona

Month	Normal Temperatures (deg F)			Normal Rainfall (inches)
	High	Low	Average	
January	44.5	18.9	31.7	1.26
February	48.4	11.6	30.0	0.99
March	53.3	15.1	34.2	1.44
April	61.5	20.5	41.0	0.58
May	70.4	38.6	54.5	0.24
June	80.2	48.0	64.1	0.47
July	79.6	53.4	66.5	4.61
August	77.4	52.4	64.9	5.09
September	74.0	47.7	60.9	2.30
October	64.0	37.0	50.5	1.77
November	52.3	25.1	38.7	1.63
December	44.6	19.2	31.9	0.77
ANNUAL	62.51	32.29	47.41	21.15

Management Considerations for FMU 1

In addition to satisfying overall program goals and objectives defined in Chapter II, fire operations will:

- Aggressively, but safely, suppress all unwanted natural or human- caused fires within the unit.
- Prevent wildland fires from spreading to adjacent lands, FMU 2, or designated sensitive cultural or natural resource areas.

Tactical objectives within FMU 1

- Conduct prescribed burns within the unit.
- Use fugitive retardant and water when deploying aerial firefighting resources, air tankers and helicopters, unless there is an immediate threat to life in which case retardant with dye may be used.
- Identify areas in the corridor that require prescribed fire treatment.
- Identify all known cultural resource areas and sensitive natural resource areas within the unit and specify in the Fire Preparedness Plan along with minimum impact management tactics relating to these areas. Such tactics may dictate no use of mechanical equipment, no line construction, and the use of retardant only in non-sensitive areas.

Table III- 4. Summary of fire behavior potential by NFDRS fuel model in both normal and extreme fire years

FIRE BEHAVIOR FUEL MODEL	NORMAL YEAR FIRE BEHAVIOR	EXTREME YEAR FIRE BEHAVIOR	REPRESENTATIVE RATES OF SPREAD AND FLAME LENGTH
C	Surface fire burning through cured grasses and litter.	Surface fire spreads rapidly through cured grasses and litter. Some spotting and torching.	Rate of spread = 35 chains/hr Flame length = 6 feet
F	Active burning with torching and isolated crown fire activity	Aggressive burning in all fuel levels, including wind driven independent crown fire; possible long range spotting; stand replacing fire.	Rate of spread = 32 chains/hr Flame length = 6 feet
G	Fire creeping through surface fuels; isolated torching.	Active burning of surface fuels contributing to torching and spotting. Potential wind driven crown fire, resulting in short and long range spotting. Possible stand replacing fire.	Rate of spread = 7.9 chains/hr Flame length = 4.8 feet
L	Surface fire spreads rapidly through fine fuels.	Surface fire spreads very rapidly and aggressively through fine fuels.	Rate of spread = 78 chains/hr Flame length = 4 feet
U	Active surface fire burning forest litter; isolated torching.	Very active surface fire with more rapid combustion and rates of spread. Torching with short range spotting.	Rate of spread = 7.5 chains/hr Flame length = 2.6 feet

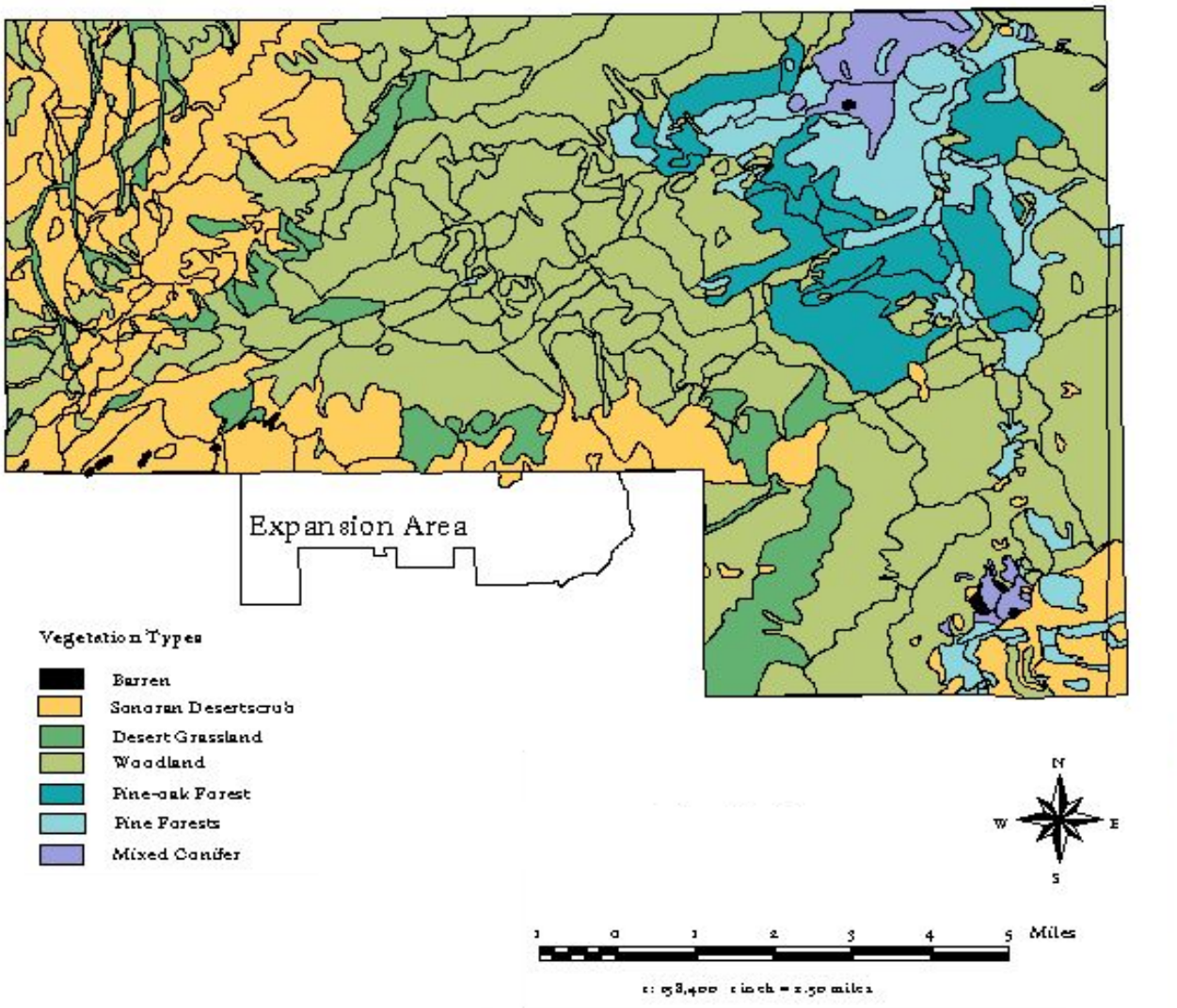

Figure III- 2. Rincon Mountain District Vegetation Communities Map

- Maximize use of long line sling operations to reduce damage to vegetation for construction of helispots.
- Ensure that minimum required equipment and qualified staff for suppression are available and operable at all times during very high and extreme fire danger periods.
- Ensure that staff are trained and qualified in wildland fire operations and understand current wildland fire policies.
- Follow the 10 Standard Fire Orders and 18 Watch- Out Situations.
- Have an approved park evacuation procedure in place.
- Use changes in fuel conditions, where appropriate, to determine line placement.
- Follow smoke management reporting procedures, in accordance with the Arizona Department of Environmental Quality (ADEQ) for all prescribed fire and wildland fire use operations.
- Assign (for the duration of the incident) a Resource Advisor if the incident is projected to last longer than one operational period.
- Assign (for the duration of the incident) a qualified Information Officer if the incident is projected to last longer than one operational period.
- Initiate fire management operations only after all personnel involved receive a safety briefing describing known hazards and mitigating actions (LCES), current fire season conditions and current and predicted fire weather and behavior.
- Carry out fire management operations with qualified individuals that promote the safe and skillful application of fire management strategies and techniques.

Constraints within FMU 1

- New knowledge and emerging issues regarding the park's T & E species and their habitat
- Wilderness value (minimum tool analysis)
- Class I Airshed restrictions
- Visitor use
- Concerns of adjacent private and federal land holders
- Access problems
- Concerns about altering the cultural landscape
- Negative public opinion relative to prescribed burns

Historic Role of Fire in FMU 1

Forests, woodlands, and grasslands occurring in FMU 1 are discussed below. FMU 1 also contains patches/strips of Mountain Wet Meadow, Mountain Dry Meadow, and Riparian Woodland/Forest communities. Meadow systems are generally fire-dependent; fire at regular intervals keeps back encroaching woody vegetation. Fires occur in wet riparian communities when conditions are right for them to move from neighboring vegetation types. Fire return might synchronize with adjacent grassy communities, but the natural breaks present in wetter, rockier canyon bottoms would limit extent of fires.

Mixed Conifer: Fire Ecology, History, and Current Condition

The Mixed Conifer type occurs at the park's highest elevations and includes both mixed conifer and ponderosa pine forests (see Table III- 1).

Chris Baisan (1990) studied fire history in the mixed conifer and ponderosa pine types of Saguaro's Rincon wilderness. Over the last 50 years, lightning has ignited an average of nine fires each year. At least one lightning fire occurred every year since record keeping began. Some years, 15 to 20 fires occurred. The pre- 1900 fire history, reconstructed from fire scars recorded at elevations from 7,595 ft to 8,666 ft, revealed a fire cycle dominated by a regular pattern of widespread fires. The MFI (mean fire interval) calculated for major fires (fires recorded by more than one group of sample trees; est. min. size: 500 acres) between 1657 and 1893 was 6.06 years. The shortest interval recorded between major fires was 2 years and the longest was 13. An interval of at least 3 years appeared to be necessary to generate enough fuel to carry a fire throughout the study area. Intervals between such fires were more commonly in the range of 4- 7 years. Of the 27 major fires that occurred between 1729 and 1900, 14 appear to have burned over the entire study area. The fire interval recorded in the mixed conifer timber of the North Slope was 9.86 years with a range of 3- 19 years. The average fire return interval for the open pine forest, which dominates most of the study area, was 7 years with a range of 2- 19 years.

Ponderosa pine and mixed- conifer forests at Saguaro currently show a departure from the normal fire return interval of 4- 7 years. As a consequence, most of these stands are overstocked and likely outside of the natural range of variability for stand structure, composition, and fuel loads. Most past prescribed fires at Saguaro have been aimed at opening up these pine stands. Over the past ten years, most of the ponderosa pine stands have been burned, and some have burned a second time. It will take repeated burns to bring forests back to a more natural, pre- suppression structure and composition.

Fire effects monitoring in 2002 found dead and down fuel loading in Saguaro's mixed-conifer forests exceeding the "natural" loading of 44 tons/acre (Sackett 1979). Increases in insect and disease infestations have also been observed. Past fire suppression likely contributed to these conditions, although drought and climate change have also been implicated in the outbreaks. Natural fire must be allowed to return and help reduce fuels to maintain natural composition and structure of this community.

Pine- Oak Forest/Woodland/Pine Forest: Fire Ecology, History, and Current Condition
The Pine- Oak Forest/Woodland/Pine Forest type combines Pine- Oak Forest and Pine- Oak Woodland and is found between grassland and conifer communities (roughly 5,000 to 8,000 ft elevation, depending on aspect).

Tree species in the woodland type are difficult to analyze for fire scars. Barton (1999) suggests that fire tolerance in pines versus sprouting in oaks might determine the relative success of the two groups in pine- oak woodlands; oaks would be favored by infrequent or low- intensity fires, and pines by moderate- intensity or more frequent fires. Chihuahua pine, unlike the others, also has the ability to sprout after fire. More frequent fire is thought to have kept woodlands and forests more open, with fewer trees,

more grass, and fewer shrubs in the understory. Abbott (1998) suggests a historical fire frequency in southeastern Arizona oak woodlands of minimally 10 to 30 years based on conservative frequencies established for neighboring coniferous forests and grasslands.

High frequency of woody species and low frequency of herbaceous species indicate a departure from the natural fire regime in the Pine- Oak Woodland type. Presence of Arizona white and Emory oaks indicates lack of fire (Carmichael et al. 1978), and both species are common in the Rincon Mountains. Swetnam and Baisan (1996) found that before 1900, widespread fires occurred in the woodland type on the average of every 8 years, with intervals as short as 2 years recorded.

Studies by Fulé (1998) on pine- oak forests in northern Mexico concluded that without fire suppression these forests remained more open and uniform. They had fewer small sprouting species (such as oak) and more older pines, suggesting that fire exclusion may have converted mostly pine forests to pine- oak. Fulé's results showed a mean fire return interval of 5.1 to 6.6 years. The vegetation, climate, and physical attributes of the northern Mexican landscape resemble those of the sky islands of southeastern Arizona. Stand structure, composition, and fuel loads in the pine- oak type of the Rincon Mountains likely were historically similar to what can be observed in the same type in northern Mexico.

A large fire in 1994 (that occurred before the park began an active prescribed burn program) resulted in moderate to severe effects in Pine- Oak Forest stands. At present, few large conifers are present, and these areas are thick with sprouting oaks and young junipers.

Desert Grassland Fire Ecology and History

Most researchers agree that fire regimes in desert grasslands have been altered since the late 1800s (Bahre 1991). Overgrazing depressed the ability of grasslands to carry fire, which consequently allowed woody species to invade. A drying trend since the turn of the 20th century has also been proposed as an explanation for the decrease in grasses and increase in woody species. Little is known about the historical extent, composition, and ecology of Saguaro's grasslands. The park may have had more than its present 6,000 acres of grassland in the past, and grazing and climate change contributed to a decrease in area, or the present extent may be similar to what was there historically. Either way, lines of indirect evidence suggest fires occurred in Sonoran Desert grasslands at least every 10 years (McPherson 1995).

The response of Desert Grassland species to fire depends more on season, frequency, and subsequent precipitation than on fire behavior. In southeastern Arizona, non-native Lehmann lovegrass may benefit from fire in Desert Grasslands and in turn may increase fire frequency and intensity. Grasslands were a likely conduit for fire in neighboring higher- elevation communities (Kaib 1998), thus depressed fire frequency in grasslands probably contributed to lack of fire in pine- oak systems over the last century.

Recorded Fires in FMU 1

As shown in Table III- 5, between 4,500 and 6,999 ft the total number of reported fires is 139, 133 of which were ignited by lightning. The typical fire occurs in midsummer, as a result of lightning, and is of small size. Over 130 of these fires occurred in what can be considered as the Pine- Oak Forest/Woodland/Pine Forest type (woodlands of pine- oak- juniper). This statistic suggests that fire is of major importance as a natural process in this community. Fire- scarred juniper and border pinyon are indicators of fires that occurred before and during the period in which records have been kept. Whether the observed long fire- free periods are typical of the plant associations found in this woodland or if they result from fire suppression activities is not known. It must be assumed that only by allowing natural fire to occur in the Pine- Oak Forest/Woodland/Pine Forest community will the natural fire frequency and role of fire be restored.

From the historic data presented in Table III- 5 it is evident that 59 percent (338) of reported fires have occurred at elevations of 7,000 ft and above, and only 2 percent (8) of these fires were human- caused.

Specifics of the Wildland Fire Management Situation

Fuel characteristics. The fuels in the park run the entire scope of the general fuel model classifications – grass, brush, timber, and slash. FMU 1 is dominated by the timber NFDRS models (C, G, and U) with brush models found in the lower elevations. For specific fire behavior characteristics associated with these fuels, see Table III- 4.

Fire regime alteration. FMU 1 has been determined to be in Fire Regime I – 0- 35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced). The plant communities are considered to be in Condition Class II, a moderate departure from historic regimes that may pose a moderate risk of loss of key components. Additional work needs to be completed on condition classes in Saguaro.

Control problems and dominant topographic features. A significant control problem is the lack of easy access to virtually any portion of the Rincon Mountains. All resources must be hiked or flown in and supplied via air or pack stock, complicating the logistical support for any fire fighting resources. The dominant topographic features in the Rincon Mountains consist of Mica Mountain (8,613 ft), Rincon Peak (8,482 ft), Tanque Verde Peak (6,850 ft), and Helen's Dome (8,364 ft). In addition to the peaks, there are two significant saddles in the mountains – Happy Valley Saddle on the east side of the Rincon Mountains and Cowhead Saddle in the center of the Rincon Mountains. Although there are numerous rock outcrops that would appear to be viable natural barriers, it has been found over the years that these barriers are susceptible to fire spread. In addition to the lack of easy access, dramatic slopes make controlling fire in this area difficult.

Values to be Protected and Special Concerns within FMU 1

- Mexican Spotted Owl Protected Activity Centers (PACS)
- Helen's Dome PAC
- Spud Rock PAC
- Italian Springs PAC
- Reef Rock PAC
- Wilderness values
- Peregrine Falcon Habitat
- Northern Goshawk Habitat
- Campgrounds
- Historic Manning Cabin (National Register Site)

The Division of Science and Resources Management has materials that contain more detailed descriptions of the above values.

Description of FMU 2

The park's objective for this FMU will be to aggressively suppress any fire using AMR except for those in the desert grassland area. Suppression actions, however, must consider values to be protected, least cost, resource damage caused by the suppression action, and the first priority at all times: firefighter and public safety.

Table III- 5. Fires reported in the Rincon Mountain District, 1937- 2002, by elevation, FMU, and cause.

Cause of Fires & Management Action					
	Human		Lightning		
Elevation	Suppression Alternative Selected	Prescribed Fire	Suppression Alternative Selected	Fires Managed for Resource Benefit	Total Fires by Elevation (%)
Below 4,500 ft **FMU 2**	44	0	36	10	90 (16%)
4,500 - 6,999 ft **FMU 1**	5	1	103	30	139 (25%)
Above 7,000 ft **FMU 1**	8	10	276	44	338 (59%)
Total Fires	57	11	415	84	567

There is approximately 1,200 acres of historic grassland in the RMD that, due to the effects of grazing and fire suppression, have been invaded by mesquite and turpentine bush. Park policy in this one area of FMU 2 will be one of allowing wildland fire use and in which prescribed fire may be applied for restoration of historic vegetative communities.

FMU 2 is comprised of two separate tracts of land. The **Rincon Mountain District** (RMD) (see Figure III- 1) contains 10,000 acres, approximately one- half of which is designated wilderness; and the **Tucson Mountain District** (TMD) (Figure III- 3), which contains 24,034 acres, with wilderness accounting for 13,200 acres. FMU 2 in the Rincon District (see Figure III- 1) is composed of the area below 4,500 ft bordered roughly by Speedway Boulevard, Freeman Road, and Old Spanish Trail. The lands adjacent to the park along these corridors are being heavily developed with residential units. FMU 2 in the Rincon District begins at 110° 35' 40" on the north boundary and runs due west to Speedway Boulevard, south to Broadway Boulevard, west to Freeman Road, and south to Old Spanish Trail. Where Old Spanish Trail intersects the District boundary at 32° 08' 52", the park boundary turns due east, then south, and finally intersects with FMU 1 at 32° 06' 38".

The entire TMD is in FMU 2. It is split by the northwest/southeast Tucson Mountains with the major geographical features of the District being Panther and Safford Peaks in the north and Wasson Peak in the south. The District is bounded roughly by Sandario Road on the west and Interstate 10 on the east. There is substantial development on the north, west, and east boundaries; the Tucson County Mountain Park shares a common boundary with the TMD. There is no history of upper elevation fire suppression in the TMD.

FMU Rainfall and Temperature Data

Table III- 6, obtained from the National Weather Service Tucson Office, represents the monthly rainfall and temperatures found in FMU 2.

FMU 2 Vegetation

The Arizona Upland, which is a subdivision of Sonoran desert scrub, occurs in the RMD from the base of the mountains, about 3,500 ft, and encompasses 90% of the TMD. The Arizona Upland is characterized by the large number of cacti and drought- deciduous habitat of many of the trees and shrubs. Vegetation within the Arizona Upland subdivision in both the Rincon Mountain and Tucson Mountain Districts can further be subdivided into associations depending on species composition. In the RMD, three associations exist within the Arizona Upland subdivision: Bursage- Palo Verde, Bursage- Saguaro Mixed- Scrub, and Creosote Bush. Additionally, several riparian vegetation series are found throughout the area of Arizona Upland: Mixed Broadleaf (sycamore- velvet ash- cottonwood), Mesquite, Cottonwood- Willow, and Mixed Narrowleaf (buttonbush- seep willow) (Guertin 1998; Brown 1994). In the TMD, six associations exist within the Arizona Upland subdivision: Creosote Bush, Creosote

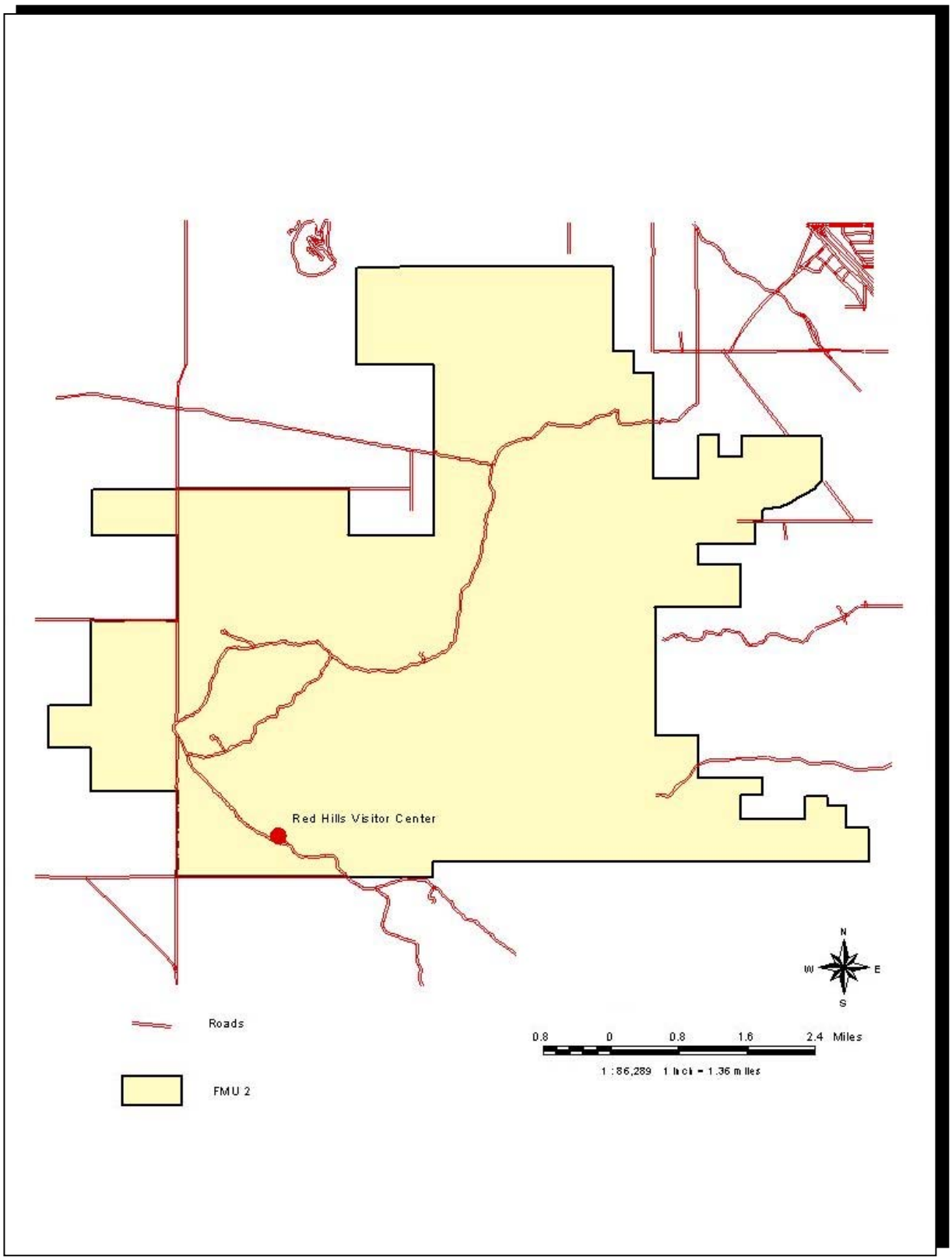

Figure III- 3. FMU 2 in the Tucson Mountain District

Table III- 6. FMU 2 Monthly and Daily Normal Temperatures (1971- 2000) plus Daily Extremes (1895- 2004) for Tucson, Arizona

Month	Normal Temperatures (deg F)			Normal Rainfall (inches)
	High	Low	Average	
January	64.5	38.9	51.7	0.99
February	68.4	41.6	55.0	0.88
March	73.3	45.1	59.2	0.81
April	81.5	50.5	66.0	0.28
May	90.4	58.6	74.5	0.24
June	100.2	68.0	84.1	0.24
July	99.6	73.4	86.5	2.07
August	97.4	72.4	84.9	2.30
September	94.0	67.7	80.9	1.45
October	84.0	57.0	70.5	1.21
November	72.3	45.1	58.7	0.67
December	64.6	39.2	51.9	1.03
ANNUAL	82.5	54.8	68.7	12.17

Bush- Bursage, Palo Verde- Saguaro- Ironwood, Palo Verde- Saguaro, Jojoba Mixed-Scrub and Desert Riparian Scrub (Rondeau et al. 1996). In addition to the Arizona Upland, there is a small patch of desert grassland in the TMD portion of FMU 2 (see Table III- 1 for elevations and species descriptions).

Strategic and Measurable Fire Management Objectives

The park intends to control 100% of ignitions in FMU 2 utilizing the appropriate management response.

Management Considerations for FMU 2

All fire management activities will have firefighter and public safety as the highest priority. Appropriate management responses for all wildland fires (regardless of ignition source) will be rapid containment and suppression to protect the public, check fire

spread onto private property, and protect the natural, cultural and historic resources of the park. In addition, fire operations will:

- Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with cooperating fire management agencies.
- Facilitate protection of values at risk by possibly using prescribed fire and mechanical treatments to reduce hazard fuel build- ups that occur in the interface areas.

Tactical Objectives within FMU 2

- Minimum Impact Suppression Tactics (MIST) will be used to the fullest extent possible, but keep firefighter and public safety first in any proposed action.
- Use fugitive retardants and water when deploying aerial firefighting resources, air tankers and helicopters, unless there is an immediate threat to life in which case fugitive retardants with dye may be used.
- Maximize use of long line sling operations to reduce damage to vegetation for construction of helispots.
- Where appropriate, changes in fuel conditions will be used in determining line placement.

Management Constraints

- Use MIST.
- No off road vehicle use unless approved by the Superintendent.
- Use of fugitive retardant unless there is immediate threat to life or property.
- Establishment of security branch or group if the incident is projected to last longer than one operational period.
- Assignment (for the duration of the incident) of a Saguaro Resource Advisor if the incident is projected to last longer than one operational period.
- Assignment (for the duration of the incident) of a qualified Information Officer if the incident is projected to last longer than one operational period.
- Park closures or restrictions will be at the discretion of the Superintendent.
- No fire management operations will be initiated until all personnel involved receive a safety briefing describing known hazards and mitigating actions (LCES), current fire season conditions and current and predicted fire weather and behavior.
- Qualified individuals that promote the safe and skillful application of fire management strategies and techniques will carry out fire management operations.

Historic Role of Fire in FMU 2

Desert Scrub Fire Ecology, History, and General Condition

Many plant species in this vegetation type are thought not to have evolved with fire, since fire is lethal to some of the plants found here (cacti, palo verde). Vegetation structure and composition are likely currently close to their historical states, but increasing presence of non- native grasses in some areas has increased fuel loads. Events

such as the 1994 Mother's Day Fire that burned 340 acres of RMD Desert Scrub may become more common with increases in density of invading grasses such as the annual red brome *(Bromus madritensis)* and perennials buffelgrass *(Pennisetum ciliare)*, and fountain grass *(P. setaceum)* (Esque 2003).

Recorded Fires in FMU 2

As shown in Table III- 5, between 1937 and 2002, FMU 2 has experienced 90 fires–most of which occurred in the RMD. Forty- four (49%) have been human caused confined primarily to the loop roads found in both districts and the boundary roads of the north and west side of the RMD and west of the TMD. Forty- six (51%) have been lightning caused with 36 of the fires (78%) receiving suppression actions while the remaining ten fires (22%) have been managed as wildland fires for resource benefit. Figure III- 4 shows the number of fires, by month, in Saguaro National Park from 1937 to 2003. The following paragraphs present the background necessary to understand the natural role of fire in the park's ecosystems. They also discuss the history of fire in the park and human factors affecting fire regimes.

Specifics of the Wildland Fire Management Situation

Fuel characteristics. The fuels in the park run the entire scope of the general fuel model classifications – grass, brush, timber, and slash. FMU 2 has predominately a brush model (F) with a grass model occurring through the unit. For specific fire behavior characteristics associated with these fuels, see Table III- 4.

Fire regime alteration. FMU 2 plant communities are considered to be in Condition Class II, a moderate departure from historic regimes that may pose a moderate risk of loss of key components. More work needs to be completed on condition classes in the TMD.

Control problems and dominant topographic features. The Tucson Mountains present minor control problems in that there are numerous rock outcrops which serve as viable natural barriers. As indicated earlier, if an ignition occurs, it is generally slowed or stopped by absence of fuels. The dominant topographic features in the Tucson Mountains consist of Wasson Peak (4,687 ft), Safford Peak (3,663 ft) and Panther Peak (3,435 ft).

Values- to- be- Protected and Special Concerns within FMU 2

- Wilderness values
- Bat caves and crevices
- Administrative structures (visitor centers, maintenance facilities, and administrative offices)
- Leopard Frog habitat
- Upland Sonoran vegetation (Saguaro cactus and Palo Verde)
- Ferruginous Pygmy Owl habitat

Even though Saguaro lies adjacent to metropolitan Tucson (population 503,151 according to a July 1, 2002 Census), there are no wildland urban interface problems to consider. Developments are along the boundaries at low elevation, in Desertscrub vegetation that does not carry fire.

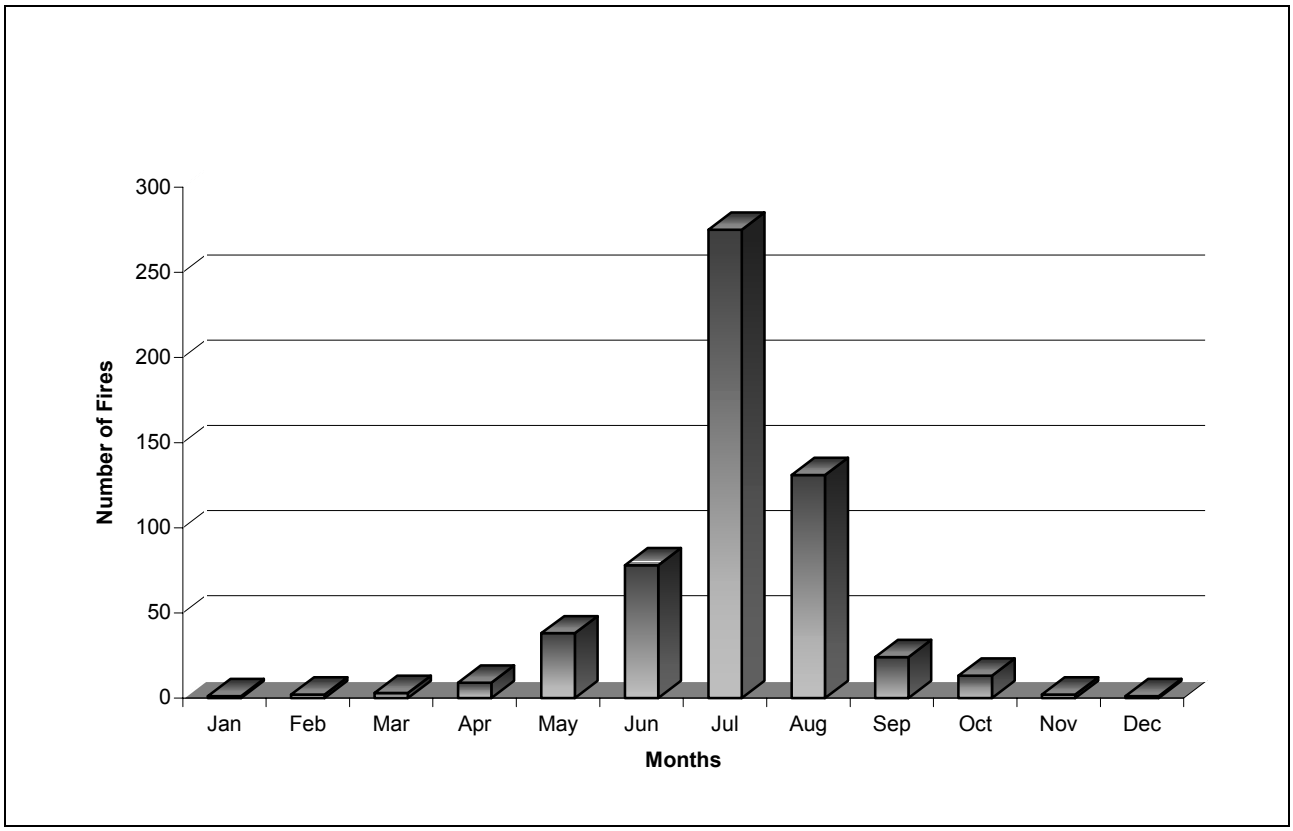

Figure III- 4. Saguaro National Park's Number of Fires By Month, 1937- 2003

Chapter IV: Wildland Fire Management Program Components

General Implementation Procedures

The strategies introduced in Chapter III each receive detailed treatment here—wildland fire suppression, wildland fire use, prescribed fire, and non- fire treatments. The fire management goals and objectives presented in Chapter III guide employment of these strategies at Saguaro National Park; protection of life and property remains the highest priority through all activities.

A Wildland Fire Implementation Plan (WFIP) will be initiated for all wildland fires. The FMO will be responsible for completing the Stage I: Initial Fire Assessment that provides the decision framework for selecting the appropriate management response. The Stage I analysis documents the current and predicted situation, documents all appropriate administrative information, and aids managers by providing them with decision criteria to make the initial decision whether to manage the fire for resource benefits or to take suppression action. Operational management decisions are described in the WFIP. Specific WFIP requirements are outlined in Chapter 4 of the Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide (IPRG), available in the Fire Management Office.

Wildland Fire Suppression

The objective of fire suppression at Saguaro National Park is to suppress wildland fires at a minimum cost consistent with values at risk while minimizing the impacts from suppression activities. Wildland fires, which threaten life, property, cultural resources, or natural resources, are considered emergencies and their management is given priority over normal park operations. However, no wildland fire situation, with the possible exception of threat to human survival, requires the exposure of firefighters to life threatening situations.

Prescribed fires which exceed the limits of defined prescription parameters may be reclassified as wildland fires and managed by an appropriate management response as defined by the Wildfire Situation Analysis (WFSA). Every Saguaro National Park employee has a responsibility to support wildfire suppression activities.

Range of Potential Fire Behavior

Potential fire behavior in Saguaro National Park can range from a creeping surface fire, with flame lengths of less than half a foot and spread rates of .1 chains/hour, to a sustained crown fire, with flame lengths in excess of 100 feet and spread rates of 400 chains/hour, depending on fuel type. Fire behavior is directly influenced by season, weather, fuel characteristics, and topography; fires burning during the monsoon rains tend to burn slower and with less intensity than fires burning before the monsoon season or in the late fall. Seasonal curing as related to fuel moisture and fuel

arrangement play critical roles in determining potential fire behavior in all vegetation types.

Preparedness Actions
The park's Prevention Plan is included as Appendix III to this plan. Appendix III also includes the Wildland Fire Prevention and Community Education overview. The objectives of fire prevention at Saguaro will be to:

- Reduce the threat of human caused fires through visitor and employee education.
- Integrate the prevention message into interpretive programs.

The FMO will insure that:
- All members of the park staff are familiar with this Prevention Plan and are able to explain it to other interested people;
- Closures and restrictions may be put into effect, in coordination with the other local fire agencies, when fire danger is very high or extreme;
- Interpretive programs include fire prevention messages to alert visitors to current fire conditions; and,
- As an active member in the Southeastern Zone (National Park Service [NPS], USFS, United States Fish and Wildlife Service [FWS], Bureau of Indian Affairs, Bureau of Land Management, and State of Arizona), Saguaro National Park will continue to work closely with those agencies to incorporate a unified fire prevention program for the zone.

Annual Training Activities
The park will offer the required annual safety training for all wildland firefighters who maintain a red card. At minimum, annual training will consist of an 8- hour firefighter safety refresher which must include training on fire shelter care and use. Basic firefighter training (S- 130/190) will be provided for all employees new to wildland fire. Since there are also experience and training requirements needed for all designated wildland and prescribed fire positions, the park will offer a variety of ICS and skills- based training classes or send employees off- park to receive required training.

Safety
- Firefighter and public safety are the first priority in all fire management activities.
- Fire personnel will meet appropriate qualifications for incident assignments, including physical fitness and medical standards.
- All wildland firefighters must meet minimum levels of fitness requirements for the type of duties they are assigned:

> **Arduous:** involves fieldwork calling for above- average endurance and superior conditioning. All firefighters are required to perform arduous duty.

Moderate: involves field work requiring complete control of physical faculties and may include considerable walking, standing, and lifting 25- 50 lbs. Safety officers and fire behavior analysts are examples of moderate duty positions.

Light: involves mainly office- type work with occasional field activity. Examples include staging area and helibase managers.

Fitness Requirement	Test	Description
ARDUOUS	PACK TEST	3- MILE HIKE WITH 45- POUND PACK IN 45 MIN
MODERATE	FIELD TEST	2- MILE HIKE WITH 25- POUND PACK IN 30 MIN
LIGHT	WALK TEST	1- MILE HIKE IN 16 MIN

- "All parks and units employing park rangers or other employees assigned law enforcement or firefighting duties may provide each such employee 3 hours of mandatory- participation in physical fitness exercise time per workweek. Pursuant to DO- 18, those wildland firefighters whose full- time duties are 100 percent arduous duty- related (such as initial attack and fire use module crews) will be provided 1 hour per day for fitness training." (NPS Reference Manual – 57, April 14, 1999).
- The park may provide those personnel assigned wildland firefighting duties with health club membership.

- Personnel assigned to arduous duty fireline operations must complete a minimum of 32 hours of basic wildland fire training, and then an annual 8- hour fireline refresher training prior to incident assignments.
  - Seasonal employees will receive the following training on an annual basis to insure that they meet minimum qualifications for Saguaro:

    1) 8- hour Fireline Refresher
    2) B- 3 – Office of Aircraft Safety Basic Aviation Safety

- Personnel must adhere to all National Wildfire Coordinating Group (NWCG) guidelines regarding maintenance of currency standards. If an employee falls out of

currency, he/she must complete any "required" course for the position and complete a job task book.

- No "live fire" shelter training exercises will be conducted or condoned.
- All wildland fire incidents which result in human entrapment, fatalities, or serious injuries, or result in incidents with potential for the above (see RM- 18 for definition), will be reported and investigated. Pending initial assessment, those directly involved in the event to be investigated will be removed from fireline duties as soon as practical, and will be made available for interview by the investigation team. Appropriate administrative actions will be taken subsequent to a full investigation.
- All safety standards and guidelines identified within the Interagency Incident Business Management Handbook will be followed.
- Management of all wildland fire incidents will comply with interagency risk management standards.
- The Job Hazard Analysis process will be used for potentially hazardous fire management activities, and for jobs which require employee use of out- of- the-ordinary personal protective equipment. See RM- 18 for Job Hazard Analysis process and format.
- Training, Qualifications, and Certification
    - All Saguaro employees assigned dedicated fire program management responsibilities shall meet established interagency and NPS competencies (knowledge, skills and abilities) and concomitant qualifications.
    - All Saguaro employees assigned to wildland fire management incidents will meet the training and qualification standards set by NWCG. NPS wildland fire qualifications standards for positions other than those defined in NWCG 310- 1 will be defined and maintained on the DOI Incident Qualification System.
    - An individual qualified and certified at the command level appropriate to the complexity level of the incident will manage all wildland fires.

Equipment and Supplies Fire Preparedness

Preparedness is the process of planning and implementing activities prior to wildland fire ignition(s) and is the foundation of an effective fire management program. Preparedness activities at Saguaro National Park are designed to insure effective and efficient fire management operations. These activities are designed to train individuals, organize supplies and equipment, recognize approaching critical fire situations, and initiate suppression actions.

All fire equipment purchased with FIREPRO funds, preparedness or suppression, is for ***fire use only*** and shall not be used for any other purpose unless prior approval is obtained from the FMO or Superintendent. Used equipment will be reconditioned and returned to serviceable condition to the location from which it was taken as soon as possible after it is no longer needed on the fire, or returned to one of the national cache units in the Southwest Region (Prescott or Silver City).

The park will maintain one cache, located in the maintenance compound in the

headquarters area of the RMD. Personnel assigned primary or collateral duties of wildland fire suppression may be reimbursed up to $100 toward the purchase of boots. Seasonals will provide a receipt showing the purchase of the boots within one month of entering duty at Saguaro National Park to receive the reimbursement.

Fire personnel will be equipped with personal protective equipment appropriate to their incident assignments.

Fire personnel, including cooperators, will comply with NWCG and NPS fitness and personal protective equipment standards while assigned to fire incidents. Mutual aid cooperators, responding to NPS fires under Memoranda of Agreement, will meet their respective personal protective equipment and qualification standards during initial action operations. However, during project fire or extended operations, cooperators will meet NWCG equipment and qualification standards.

Fire preparedness is the year- round organized inventory and assessment of equipment and personnel. The park has developed a summary list of all preparedness activities by month. This comprehensive calendar of preparedness activities is located in the Yearly Readiness Checklist (Appendix V). As part of the preparedness program, all operations modules and support personnel will be assessed annually through a preparedness review and inspection program. In addition, mandatory pre- and post- season operations preparedness and review meetings are held each spring and fall.

Fire Weather and Fire Danger

Weather Stations

The park has one weather station in the RMD and uses one additional station on the Santa Catalina Ranger District, Coronado National Forest, that provides daily information. These stations are Remote Automated Weather Stations ((RAWS) 021207(Rincon) and 021202 (Saguaro)). These stations catalogue fire weather hourly and the information is used for our National Fire Danger Rating System (NFDRS) indices calculations. The 021207 (Rincon) station is located southeast of Manning Camp on the south flank of Mica Mountain at 8,240 ft. Thresholds are identified using fuel model C and G. The 021202 (Saguaro) station is located at Sabino Canyon on the south side of the Santa Catalina Mountains at 3,100 ft. Thresholds from this station are identified using fuel models F and B.

NFDRS Indices

The parks' division of fire and aviation tracks NFDRS fire danger indices and plots them against historical averages. Energy Release Component (ERC) and the Burning Index (BI) are determined using models C and G from the Rincon station and models F and B from the Saguaro station. These assess relative expected wildland fire behavior for all potential ignitions.

In combination, the parks' daily staffing levels, step- up plan, and response plan all tier from the park- wide fire danger indices derived by looking at the ERC and BI from the Rincon and Saguaro stations.

Each weather station's catalog and associated FireFamily+ runs for the past ten years can be found on the National Fire and Aviation Management Web Applications website (http://famweb.nwcg.gov/) as needed. In addition, seasonal (May through October) FireFamily+ runs for the two stations described in the preceding paragraph are posted in the Southeast Arizona Zone Dispatch as an aid to seasonal comparison of fire danger with past years.

Step- up Staffing Plan

The Step- Up Staffing Plan (Table IV- 1), based on the National Fire Danger Rating System (NFDRS), facilitates park fire preparedness and is formulated to preposition fire suppression resources when indicated by NFDRS staffing classes. The Step- Up Staffing Plan identifies patrols and activities to enhance detection as fire danger increases.

Accounts supporting emergency preparedness and step- up plans may be established without an allocation or prior approval. Step- up plans address intermittent periods in or out of fire season when fire danger is very high or extreme. Emergency step- up plan preparedness activities specified in a park fire management plan can be approved by the Superintendent. These accounts will accrue negative balances during the year and all expenditures and obligations will be funded by WASO Budget Office at year- end closing. Each incident should have a unique project account number.

Pre- attack Plan

A Suppression Fire Response Plan has been developed for use by the park and its cooperators. The plan characterizes response for those lands in each of the agencies' jurisdictional areas for which shared response is beneficial. The plan is reviewed annually and undergoes thorough revision every five years. Response levels vary based upon daily fire danger staffing level determinations.

The pre- attack plan for the Park is found in the annual *Fire Preparedness Plan*, located in the fire management office as well as the air operations office. The pre- attack plan contains essential fire management information that must be available to fire management and dispatch offices. The plan assists fire managers in decision making and allocation of resources. It is also a source of information on outside help such as hospital locations, local/regional law enforcement contacts, merchants, and equipment suppliers. The pre- attack plan complies with those elements as detailed in RM- 18, Chapter 7.

The Southeast Arizona Zone Coordination Center, identified as 'Dispatch,' will serve as the park's Initial Attack Fire Dispatch. Radio frequencies within the park are as follows:

Table IV- 1. Step Up Staffing Plan

Saguaro National Park STEP- UP STAFFING PLAN	
Burning Indices	
FM- C	**Minimum Staffing Level**
0- 4	**One:** 1. Normal tours of duty. 2. Normal fire management operations. 3. Monthly fire situation reports provided to visitor centers, headquarters, and helibase.
5- 9	**Two:** 1. Normal tours of duty. 2. Normal fire management operations.
10- 18	**Three:** 1. Normal tours of duty. 2. Normal fire management operations. 3. LAL of 4 or above, move to Staffing Level IV.
19- 24	**Four:** 1. Permanent fire staff member qualified at or above Incident Commander Type 3 or Task Force Leader will available for management of fires within the park. 2. Weekly situation reports will be available to park staff. 3. Lieu days may be canceled or tours of duty extended. 4. 2- 4 initial attack firefighters available. (refer to Table IV- 2) 5. Aerial reconnaissance - if indicated by lightning activity. 6. Restrictions may be established.
25+	**Five:** All management actions in Staffing Level IV with the following amendments: 1. Closure of backcountry/wilderness areas to visitors may be imposed.
Fuel Model C indices are based on Rincon RAWS (021207).	

Rx	Tx	
Line of Site -	166.350 MHz	166.350 MHz
Repeater -	166.350 MHz	167.150 MHz (Mt. Lemmon (127.3));
	166.350 MHz	167.150 MHz (Keystone (141.3));
	166.350 MHz	167.150 MHz (Safford (156.7));
	169.600 MHz	169.600 MHz (Forest Net);
	169.600 MHz	170.525 MHz (Forest (103.5)).

Initial Attack

Initial attack is an aggressive suppression action consistent with firefighter and public safety and values to be protected. Every wildland fire will receive appropriate initial attack. The goal of initial attack is to prevent the escape of the fire and limit damage to values at risk while minimizing burned area. Table IV- 2 lists the expected response times by resource type and season. The FMO is responsible for the assignment of suppression forces, including designation of a qualified Incident Commander (IC). The IC will request additional resources through the Southeast Zone Dispatch.

Information used to set priorities

The first criteria that will be used to establish initial attack priority will be the degree of threat to critical resources in the park and on adjacent lands. If multiple starts have occurred within the park, or on adjacent lands, the ignition presenting the greatest threat will receive initial attack resources immediately.

Criteria for Response

All ignitions in the park will receive an initial size- up to determine candidacy for wildland fire use or for an appropriate management response alternative. The level of initial attack response will be based on current conditions and values at risk. The level of the response will be based on the following factors:

- Firefighter and public safety - response will not jeopardize firefighter and public safety.
- Mexican spotted owl habitat and PAC – the initial attack response will not result in long- term or irreparable damage to habitat/habitat characteristics, unless direct fire effects would result in more damage than suppression actions.
- Official wilderness – the initial attack response will be in accordance with the Wilderness Act (using the Minimum Requirement Decision Analysis) and MIST will be utilized in wilderness areas. Mechanized equipment on and over wilderness may be used only with Superintendent approval and a memo to the file.
- Sensitive resources and resource areas—response will utilize MIST for initial attack. Sensitive resources and resource areas are listed in the Fire Preparedness Plan.

Table IV- 2. Fire Response Times

Resource Type	Response Time	Time of Year
Overhead	30 minutes	January 1 – April 30
Initial Attack Crew	1- 1.5 hours	
Initial Attack Aircraft (rotor)	30- 45 minutes	
Overhead	15 minutes	May 1 – September 30
Initial Attack Crew	30- 60 minutes	
Initial Attack Aircraft (rotor)	30- 45 minutes	
Overhead	30 minutes	October 1 – December 31
Initial Attack Crew	1- 1.5 hours	
Initial Attack Aircraft (rotor)	30- 45 minutes	

Confinement as an Initial Attack Suppression Strategy

A confinement strategy may be implemented as the initial attack action under the appropriate management response as long as it is not used to meet resource objectives. Resource objectives may be considered in the decision making process, but cannot be the prime criteria for the decision. Confinement is selected in lieu of wildland fire use to maximize firefighter safety, minimize suppression costs, minimize cost + loss in low valued and commodity resource areas, and to maximize availability of critical suppression and management resources during periods of high fire danger associated with fire in highly valued resource areas.

Confinement can also be the appropriate management response through the WFSA process when the fire is expected to exceed initial attack capability of planned management capability. When confinement is selected as the initial action, the same management process applies as for wildland fire use decisions. A long- term implementation plan is needed to guide the implementation of the confinement strategy. The WFIP, prepared in stages, meets this requirement.

Restrictions and Special Concerns

The park has identified a general set of restrictions and concerns for the fire management program at Saguaro. For specific incidents, a **Delegation of Authority** will be developed that allows the Superintendent to turn over fire management activities to an Incident Management Team, Fire Use Manager (FUMA), FUMT, or IC from outside the park. The Delegation of Authority contains specific restrictions and critical concerns for the management team and will include key cultural features, key resource concerns, restrictions, and approved tools, and will identify agency representatives and advisors.

Listed below are the general restrictions and concerns that will apply to any fire management action:

- Provide for firefighter safety.
- Manage incident with appropriate management response actions that cause minimal resource damage.
- Manage the fire cost- effectively for the values at risk.
- Provide training opportunities for the park personnel and other cooperators to strengthen organizational capabilities.
- Provide for minimum disruption of visitor access, consistent with public safety.
- Provide for protection of Mexican Spotted Owl habitat and PAC, official wilderness, and sensitive resources.

Sensitive Resources and Local Economic Concerns

Chapter III introduces sensitive resources and developments in each fire management unit. Of particular concern are archeological sites and Mexican spotted owl habitat. The EIS (Appendix II) covers these concerns, and they are also addressed in Chapter X of this plan. The Cultural Resources Matrix (Table IV- 3) identifies sensitive cultural resource types and describes fire- related actions they tolerate, those to avoid, and mitigation measures. The EIS (approved 2004) for this FMP also discusses how suppression actions affect visitors and the local community. Visitors have multiple local alternative destinations in the general area to take advantage of during fire activities in the park.

Extended Attack

Extended attack occurs when a fire has not been controlled by the initial attack forces and continues either until transition to a higher level incident management team is completed or until the fire has been controlled. Extended attack action requires a Wildland Fire Situation Analysis (WFSA) to guide the re- evaluation of suppression strategies.

When complexity levels exceed initial attack capabilities, the appropriate Incident Command System (ICS) positions should be added commensurate with the complexity of the incident. The Incident Complexity Analysis and the WFSA assist the manager in determining the appropriate management structure to provide for safe and efficient fire suppression operations. When additional positions are required for management of wildland fires, the FMO or Acting will coordinate orders with the Incident Commander (IC) and Southeast Zone Coordination Center or expanded dispatch.

A unified command structure will be a consideration in all multijurisdiction incidents.

The Superintendent will approve the WFSA and any revisions.

Table IV- 3. Saguaro National Park Cultural Resources Matrix

Historic Context	Resource Type	Elements	Elements or Values at Risk	Risk Conditions	Management Goals	Treatments Objectives
Prehistoric Sites	Artifact Scatter/Lithic Scatter/Quarry	Artifacts and features	**Distribution of the artifacts above and below the ground**	Ground disturbance	Avoid ground disturbance	Any suppression activities EXCEPT ground disturbance
	Agricultural sites	Rock features and artifacts	Integrity of features and distribution of artifacts	Ground disturbance	Avoid ground disturbance	Any suppression activities EXCEPT ground disturbance
	Rock Art	Paintings and Petroglyphs	Integrity and visibility	Fire, heat, sooting, spalling	Mechanically reduce fuels if appropriate.	Most suppression activities are appropriate. Avoid applying cold liquids (water or retardant) to hot rock surfaces.
	Rock Shelters	Subsurface deposits, rock art	Integrity of cultural deposits	Ground disturbance, fire, heat, sooting	Mechanically reduce fuels if appropriate	Most suppression activities are appropriate. Avoid applying cold liquids (water or retardant) to hot rock surfaces.

Historic Context	Resource Type	Elements	Elements or Values at Risk	Risk Conditions	Management Goals	Treatments Objectives
	Bedrock Mortars	Bedrock Mortars	Little risk from fire	Spalling	Mechanically reduce fuels if appropriate	Most suppression activities are appropriate. Avoid applying cold liquids (water or retardant) to hot rock surfaces.
Historic-Period Sites	Manning Camp	Cabin, Corral, Landscape	Cabin and Landscape	Cabin could be destroyed by fire	Maintain historic cabin and landscape	Any suppression activity
	Freeman Homestead	Melted Adobe Structure, Well, Tamarisk Tree	Features and landscape	Ground disturbance	Avoid ground disturbance	Any suppression activities EXCEPT ground disturbance
	Mining Sites	Pits, Shafts, Adits, Trash, Ruined Structures	Historical trash deposits and wooden elements	Low risk	Maintain historic appearance	Any suppression activity
	Ranching Sites	Structures, Fence Posts, Corrals, Windmills, Trash	Historical trash deposits and wooden elements	Low risk	Maintain historic appearance	Any suppression activity
	Lime Kilns	Lime Kilns, Waste Piles	Integrity of kilns and Landscape	Erosion, ground disturbance	Mechanically reduce fuels if appropriate; avoid ground disturbance	Any suppression activities EXCEPT ground disturbance

Historic Context	Resource Type	Elements	Elements or Values at Risk	Risk Conditions	Management Goals	Treatments Objectives
	CCC Sites	Picnic Areas, Camp, Check Dams, Walls	Wooden components of masonry features and landscape	Loss of original wood components	Mechanically reduce fuels if appropriate	Any suppression activity
	Historic- Period Trash Scatters	Historic-Period Trash Deposits	Integrity of the deposit	Low risk	Avoid ground disturbance	Any suppression activity
Landscapes	Saguaro Harvest Camp	Ramadas, Fences, Features and Artifacts	Integrity of the site and landscape	Wooden structures, features and artifacts	Mechanically reduce fuels if appropriate	Any suppression activity
	Ethnographic Landscapes	To be determined through consultation	To be determined through consultation	To be determined through consultation	To be determined through consultation	To be determined through consultation
	Potential Landscapes: CCC, Manning Camp, Freeman Homestead, Amole Mining District, Lime Making Industry Landscapes	See above under Historic-Period Sites	See above under Historic- Period Sites	See above under Historic-Period Sites	See above under Historic-Period Sites	See above under Historic- Period Sites

Historic Context	Resource Type	Elements	Elements or Values at Risk	Risk Conditions	Management Goals	Treatments Objectives
	Rincon Mountain Foothills Archeological District Landscape	Archeological sites and their distribution across the landscape	Integrity of the sites	See individual site types above under Prehistoric Sites	See individual site types above under Prehistoric Sites	See individual site types above under Prehistoric Sites

Implementation plan requirements - WFSA development

The WFSA is a decision making process in which the agency administrator or representative describes the situation, compares multiple strategic wildland fire management alternatives, evaluates the expected effects of the alternatives, establishes objectives and constraints for the management of the fire, selects the preferred alternative, and documents the decision. The format and level of detail required depends on the specific incident and its complexity. The key is to document the decision made. The park does not have a prepared WFSA, however, a WFSA will be completed whenever a fire escapes initial attack. The Agency Administrator, his/her representative, and the FMO or Incident Commander, prepares the WFSA.

An electronic copy of the WFSA can be found at www.fws.gov/fm/policy/HANDBOOK or at www.fs.fed.us/land/fire/wfsa.htm.

Complexity decision process for incident management transition

An Incident Complexity Analysis will be used as a guide for ICs, fire managers, and agency administrators to evaluate emerging fires in order to determine the level of management organization required to meet agency objectives. This will assist in identifying resource, safety, and strategic issues that will require mitigation.

The criteria for the need to transition from initial attack to extended attack are as follows:

- the fire cannot be contained with initial attack resources within two operational periods (48 hours) of fire detection
- fire behavior exceeds capability of initial attack resources to contain the fire
- the fire threatens any park or non- park natural or cultural resource for which there may be media focus and public concern

The criteria for the need to transition from extended attack to Type 1 or Type 2 incident management will follow guidelines in the Interagency Standards for Fire and Fire Aviation Operations.

There are two types of Incident Complexity Analysis available: 1) For Type 1 and 2 incidents use the form located in Appendix VI. For Type 3, 4 and 5 Incidents use the form located in Appendix VII.

As an incident becomes more complex, the need for an incident management team or organization increases. To facilitate the FMO in assembling an efficient and effective organization, key managers should be involved during the early stages of complexity analysis. The analysis is not a cure- all for the decision process; local fire history, current fire conditions, and management requirements must be considered.

Delegation of Authority

In the event of a transition to an Incident Management Team, the transfer of authority for wildland fire suppression is accomplished through the execution of a written limited delegation of authority from the Superintendent to the Incident Commander. The procedure facilitates the transition between incident management levels and is a component of the briefing package provided to the incoming incident management team. The Delegation of Authority form is contained in Appendix VIII.

Exceeding existing WFIP – selecting a new strategy

All fires that exceed the scope of the existing WFIP will require a WFSA. Conditions that cause an existing WFIP to be exceeded include:

- inability to control wildland fires during the initial suppression response action
- unsuccessful management response
- unsuccessful prescribed fire or failure to attain desired fire effects
- failure to meet every element of the decision criteria checklist
- projection that fire will leave NPS jurisdiction and the adjacent jurisdiction will not or cannot accept management of the fire.
- approval of WFIP by the Superintendent not received
- regional or national conditions outweigh potential local benefits of the fire per the regional FMO, and AMR action is warranted.

Minimum Impact Suppression

Fire suppression activities by federal land managers, including the NPS, require fire suppression personnel to select tactics commensurate with potential fire behavior and values at risk, with minimal environmental impact. Minimum impact suppression is founded in an awareness of cultural and natural resources. Saguaro National Park will execute minimum impact suppression in accordance with agency guidelines. A Resource Advisor will be requested for all incidents and will be incorporated into the Agency Administrator's Briefing and Delegation of Authority to any incoming Incident Management Team. Minimum impact tactics used at Saguaro will include, but are not limited to:

- Water or fugitive retardant may be used.
- Firelines should be kept to the minimum width necessary to stop the fire's spread. Whenever possible, natural barriers should be utilized to avoid unnecessary fireline construction.
- Cold trailing of the fire- edge rather than digging handlines is preferred whenever possible.
- Wetline should be used in lieu of handline construction if water and pumps are available.
- All firelines, spike camps, or other disturbances inside the park should be rehabilitated to maintain a natural appearance.
- Tree felling should be minimized, especially in visually sensitive areas. Later, during rehabilitation, the "slant cut" technique, which faces the cut away from view, or flush cutting stumps is preferred.
- Trees, limbs, brush, and other debris should be scattered and not left in piles. This

debris will be used in rehabilitation efforts by placing it over previous constructed firelines.

- Protective tactics should be used in areas identified by the Resource Management Specialist as having cultural significance, either archeological or historical.
- Protective tactics should be used in areas identified as being sensitive for natural resources.
- The Incident Commander is charged with incorporating minimum impact tactics into the suppression efforts in all operational plans.
- Heavy equipment, such as dozers, will not be used without approval by the Superintendent.
- No vehicles should be driven off- pavement without the Superintendent's written approval.

Rehabilitation Guidelines

Despite the best intentions of minimum impact management, wildland fire actions often create the need for short- or long- term rehabilitation. Staff will consult with specialists (archeologists, hydrologists, plant ecologists, wildlife biologists) to determine short- and long- term needs and to write rehabilitation plans for each fire, then will implement and monitor the plans. Common rehabilitation recommendations include flush cutting stumps, brushing in handlines, removing all trash, installing erosion control devices, and falling hazardous trees in human- use areas. Reseeding or revegetation after wildfires requires the prior written approval of the Regional Director. For long- term rehabilitation, a Burned Area Emergency Rehabilitation Plan will be developed and submitted to the Regional Office for approval prior to any rehabilitation actions.

Erosion due to fire is an important issue at Saguaro. As the majority of fires in Saguaro National Park remain relatively small in size, a guide for construction of waterbars as needed on firelines is defined below. Fireline gradient intervals for waterbars are as follows:

- If the percent of slope is less than 15%, construct waterbars at intervals between 200' and 150'
- If the percent of slope is 15 to 30%, construct waterbars at intervals between 100'and 75'
- If the percent of slope is 30 to 45%, construct waterbars at intervals between 65' and 50'
- If the percent of slope is steeper than 45%, construct waterbars at intervals between 30' and 25'

These are minimum standards and are not intended to restrict the implementation of additional standards if the need is indicated.

Records and Reports

Fire reporting follows guidelines established by NPS policy and Directors Order 18 and the associated reference manual, RM- 18 (NPS 1998, 1999b). All fires, regardless of type, are

required to have a written report, which is tracked at park and national levels. The following documents are included in this final wildland fire record:

- DI- 1202, Individual Fire Report
- Narrative
- WFIP or WFSA
- Daily weather forecasts and spot weather forecasts
- Cumulative fire map showing acreage increase by day
- Total cost summary
- Monitoring data

The park's FMO is responsible for completion of these reports and consolidation of all materials. As soon as a fire is declared out, the report is finalized and delivered to the fire program office where it is entered into a national database known as the Shared Automated Computer System (SACS). The hard copy of the 1202's are also filed in the fire administrative office, and any 'fire package' is stored in the park. The SACS system permits the entry of statistical data on wildland fire occurrence and the use of prescribed fire. It also permits a wide variety of screen queries and batch reports for the analysis of this data. The Department of Interior uses Form DI- 1202 to report such fires. The Fire Occurrence System generates the report in this format. The following reports can be generated and printed in Boise, Idaho or at remote sites (not an inclusive list):

- Summary of Fires by Discovery Type
- Summary of Suppressed Fires/Size Class
- Summary of Suppressed Fires by Month
- Summary of Wildfires NFDRS Risk Analysis
- Cause Analysis Reports
- Summary of Multiple Starts for Wildfires
- Fire Type Summary
- Fire Occurrence Summary; Wild or Natural
- Individual Fire Report by Park or Region
- Fire Occurrence Summary/Park or Region

Wildland Fire Use

The general plan for wildland fire use will prepare Saguaro National Park for effectively managing wildland fire use operations.

The purpose of this section of the FMP is to set forth criteria and procedures to make prompt and informed decisions concerning the implementation and management of wildland fire; to weigh the risks and benefits posed by the fire, as well as thoroughly document this analytical process; and to detect as early as possible any reasons for reclassification of the fire to an appropriate management response.

NOTE: THE PARK'S WILDLAND FIRE FOR RESOURCE BENEFIT PROGRAM WILL OPERATE AS LONG AS THERE IS A FULLY QUALIFIED FUMA AVAILABLE IN PARK, OR AVAILABLE WITHIN ONE HOUR AFTER AN ORDER IS PLACED.

Objectives
Wildland fire use is a step toward restoring natural fire regimes in the park. Fuel buildups that are the legacy of the full suppression era dictate that great caution is still required when considering letting natural ignitions burn. Wildland fire use must be soundly based on management objectives—public and firefighter safety, natural and cultural resources benefits, and interagency collaboration—and may include the full range of fire management strategies on a fire's entire perimeter. The objectives of wildland fire use are listed individually in each WFIP and are specific to each wildland fire use for resource benefit response.

Decision Parameters
All wildland fires will be assessed through the appropriate level of WFIP analysis and the *appropriate management response* will be chosen. The decision criteria and risk factors to consider in the Stage I analysis are outlined in Saguaro National Park's Wildland Fire Implementation Plan – WFIP (Appendix IV). Parameters requiring in- depth analysis for Saguaro often include: off- site impact to air quality, seasonal fire danger/drought and its relation to fire spread (including chances of fire spreading off- park into jurisdictions lacking fire use capability), availability of resources, on- site impacts to cultural and natural resources, and threats to human life. If fire spread can be managed with available resources, if ecological values will be enhanced, if cultural values can be protected, and if air quality effects to the Tucson Basin and Southern Arizona airshed are minimal or manageable, then fire use projects are acceptable.

Assessment includes data gathering and situation analysis (i.e. internal and external values which are enhanced or require protection, management objectives, safety, climatology and weather, fuel conditions, and fire behavior). The *appropriate management response* ranges from monitoring with minimal on- the- ground disturbance to intense suppression actions on all or a portion of the fire perimeter. The response will vary from fire to fire and even along the perimeter of a fire as conditions change over time.

Pre- planned Implementation Procedures
Annual Activities:
January – April (preseason):
- Update weather data for use in long- term fire spread projections to support fire use decisions.
- Enter all Saguaro employee qualification records that are involved in wildland fires into, and maintain annually on, the DOI Incident Qualification System. Cards will be issued each spring after completion of the annual 8- hour fireline refresher, physical clearance (annual, periodic, baseline exams), and appropriate physical fitness test (pack, field, or walk test).
- Review the FMP and do annual updates with the Superintendent's signature. Review

Wildland and Prescribed Fire Implementation Policy Reference Guide and track fire season indices to support fire management decisions.
- Review and update interagency agreements to ensure that resources are available to support fire use decisions.
- Review ADEQ Smoke Management Guidelines to insure smoke management actions are in compliance with ADEQ Guidelines.
- Complete Pre- Season Fire Management Briefing for Park Staff.
- Complete refresher training, physical fitness testing, and equipment inventories.

May – September (fire season):
- Monitor daily fire weather, regional and national situation reports, Haines Index, Palmer Drought Severity Index, and resource conditions.
- Update local cooperators on a weekly basis.

October – December (post season):
- Complete Post- Season Fire Management Briefing for Park Staff.

Pre- Planned Actions:
When a fire is reported, the park will take the following actions:
- **Locate the fire**
- **Size- up and determine cause**
- **Complete a WFIP Stage I analysis** to determine the *appropriate management response* within two hours of fire confirmation.
- **Receive confirmation** from the Arizona Department of Environmental Quality for management of the fire as a fire use project on the day of fire confirmation.
- **Choose the *appropriate management response*** based on the previous Stage I analysis. In this example, the decision is made to manage the fire for resource benefit because the agency administrator found the potential for complexity, climatology, projected fire behavior, natural and cultural resource effects, and relative risk indicators to be acceptable.
- **Implement the *appropriate management response*** – For fire use projects this may vary from periodic aerial reconnaissance to on- scene fire monitors. If the management complexity of the fire exceeds the capabilities of local resources, the parks will manage the incident through delegation to a Fire Use Incident Management Team (for a delegation of authority example, see Appendix VIII).
- **Continue to reassess the fire situation** – During a fire use project the park must perform periodic fire assessments. The superintendent must continually validate and approve that the fire is managed appropriately and will assess if there is a need for a more detailed stage II or III WFIP analysis, or conversion to a wildland fire suppression action. The frequency of the periodic fire assessment will be indicated on the signature page of the Periodic First Assessment form attached to the WFIP. Signature frequency can range from daily (high complexity, high risk fires) to weekly (low complexity, low risk fires). If the periodic assessment indicates that the fire can no longer be successfully managed for resource benefit, a WFSA will be prepared to analyze and

document changes in fire management strategy. The WFSA format is also in the IPRG (Appendix IX).

- **Manage the fire until declared out** according to monitoring and frequency guidelines indicated in the WFIP. At the minimum, periodic ground or aerial reconnaissance will be used to verify the periodic revalidation of the fire use response. More in- depth monitoring may be necessary to ensure proper incident management if complexity or risk increases. The parks monitor for wind speed, wind direction, smoke plume rise and dispersal, temperature, humidity, fuel moisture, fire size, and fire behavior (rate of spread, direction of spread, intensity).

Unplanned Fire Implementation Procedures
The most current version of the IPRG will be the basis for completion of WFIPs. Until declared out, any fire use fire will be periodically assessed (daily or more frequently) and this assessment documented by the Superintendent on the Periodic Fire Assessment form found in the IPRG. For unplanned ignitions, the implementation procedures for assessment, planning, and implementation will be the same as identified in the pre- planned fire implementation procedures and are listed in the previous section.

Impact of Plan Implementation and Mitigation
See the EIS (Appendix II) for detailed information on impacts of plan implementation and mitigation. The EIS prepared for this plan addresses the impacts of wildland fire use and mitigation measures. The strategy is justified by the need to return fire to fire- adapted systems (see Chapter III), but implementation requires acceptance of short- term losses in exchange for long- term ecological benefits. The FMO will use WFSA to determine potential impacts of wildland fire use in the event that strategy is applied.

Staffing and Criteria for Implementing and Managing Wildland Fire Use for Resource Benefit (WFURB)
When an ignition occurs the following positions will make up the implementation management team that will be responsible for initiating steps in the decision process necessary to support the appropriate management response, whether it be wildland fire use or suppression.

Superintendent:

- Responsible for making the Go/No Go Decision based on information provided by the FMO/Fire Use Manager
- Signs the WFIP and periodic assessment to validate the WFIP decision
- Declares park restrictions and/or closures as needed
- Issues a written delegation of authority in the event a Fire Use Management Team is assigned to a wildland fire use project at Saguaro and assigns an agency representative
- Insures that fire information is managed as described in Saguaro's FMP, Chapter XI

It is recommended that this position receive the following training:

- Fire Management for Agency Administrators
- National Park and Wilderness Fire Management
- One post- season wildland fire use review or evaluation

Chief Ranger:
- Evaluates fire activity in terms of public and employee safety and makes recommendations to the superintendent for closures or restrictions
- Insures patrols are used to enforce restrictions or closures
- Designs and implements the park evacuation plans at the discretion of the superintendent
- Insures that a comprehensive fire management program at the park is adequately planned for and implemented
- Assists in development of Maximum Manageable Area and management decision points

It is recommended that this position meet the following qualifications and/or conditions:
- Receive Fire Management for Agency Administrators training
- Receive National Park and Wilderness Fire Management training
- Be familiar with park resources.
- Be familiar with wilderness laws, policies, and philosophy.

Fire Management Officer:
- Insures implementation of fire management plan and coordinates wildland fire and prescribed fire programs
- Insures that the fire program is managed within RM- 18 guidelines
- Analyzes fire weather and fire season severity to support fire use decisions, preparing WFIP stage I and the Relative Risk Rating Chart on all wildland fires
- Establishes the review timeframes for periodic assessment on all declared wildland fire use projects
- Completes WFIP Stage II, coordinates with state air quality, local wildland agencies, and orders resources as needed, such as monitors, fire behavior analyst, or a Fire Use Management Team
- Provides input into Maximum Manageable Area and long- term risk assessment in accordance with Stage III
- Serves as the Fire Use Manager for wildland fire use projects

This position will meet the following qualifications and conditions:
- NWCG qualifications as outlined in the Interagency Fire Program Management Guidelines.
- Knowledge and experience in the fuel types and ecosystems referenced in this plan
- Knowledge and experience with wilderness resources
- Attend National Park and Wilderness Fire Management
- Attend Fire and Ecosystem Management
- Participate in one post- season wildland fire use review or evaluation

- Be able to perform this assignment for the duration of the event. Would be unavailable for fire suppression assignments

Fire Program Management Assistant:
- Acts as logistics coordinator and comptroller for project
- Orders resources, supplies, equipment, and materials to support wildland fire use projects
- Tracks daily expenditures against the fire account, reports expenditures to the FMO and prepares a final financial package as an official record of the project that will be reviewed during program audits

Fuels Specialist:
- Performs long term risk assessment using advanced fire spread modeling technology
- Models smoke emission and transport for documenting air quality impacts
- Provides input into Maximum Manageable Area and management decision point development
- Acts as FMO when FMO is absent

This position will meet the following qualifications and/or conditions:
- NWCG qualifications as outlined in the Interagency Fire Program Management Guidelines.
- Be familiar with park resources
- Attend National Park and Wilderness Fire Management
- Attend Fire and Ecosystem Management
- Knowledge of and ability to operate FARSITE and RERAP fire prediction programs

Fire Ecologist:
- Monitors and documents fire weather, behavior, and fuel consumption and map location
- Works with the Resource Advisor for coordination of monitoring requirements, methods, and staffing
- Provides feedback to the FMO and or fire use manager in terms of fire use and resource management objectives
- Assists in development of Maximum Manageable Area and management decision points

It is recommended that this position meet the following qualifications and/or conditions:
- Be familiar with park resources.
- Be familiar with wilderness laws, policies, and philosophy.
- Attend National Park and Wilderness Fire Management.
- Attend Fire and Ecosystem Management.
- Knowledge of and ability to operate GIS/GPS systems and FARSITE and RERAP

fire prediction programs.

Resource Management Specialist(s):

- Provides input during candidate and ongoing wildland fire use projects regarding sensitive species and special resource concerns
- Assists in development of Maximum Manageable Area and management decision points
- Aids in development and implementation of individual monitoring plan for each WFIP Stage in coordination with the Fire Ecologist

It is recommended that this position meet the following qualifications and/or conditions:

- Be familiar with park resources
- Be familiar with wilderness laws, policies, and philosophy
- Attend National Park and Wilderness Fire Management
- Attend Fire and Ecosystem Management

Resource Advisor(s):

- Provides field and resource specific input during candidate and ongoing wildland fire use projects
- Assists in development of Maximum Manageable Area and management decision points
- Aids in development and implementation of individual monitoring plan for each WFIP Stage in coordination with the Fire Ecologist

It is recommended that this position meet the following qualifications and/or conditions:

- Be familiar with park resources.
- Be familiar with wilderness laws, policies, and philosophy.
- Attend National Park and Wilderness Fire Management.
- Attend Fire and Ecosystem Management.
- Resource advisors that work on any active portion of fireline **must** meet physical fitness requirements for an arduous duty fire qualification card (red card).

Public Information and Interpretation of the Wildland Fire Use Program

The FMO, Chief of Ranger Services, and Park Information Officer will meet after the initial designation of a wildland fire in order to determine the most appropriate information and interpretive needs. In order to cover the information and interpretive needs, the Chief of Interpretation and Information Officer will ensure that the appropriate initial actions are taken. These actions are listed in Chapter IX.

Key agency, state, and local contacts for public information include:

- Saguaro National Park, Rincon Mountain Visitor Center Information Desk (520- 733-5153), Fire Management Office (520- 733- 5130/5131/5133), Fire Information Officer (during ongoing wildland & prescribed fire incidents)

- Southeast Arizona Zone Dispatch Office, Coronado National Forest (520- 670- 4832)
- Santa Catalina Ranger District Office (520- 749- 8700)
- Arizona State Land Department, Tucson District FMO (520- 628- 6015)
- Arizona State Department of Environmental Quality, Interagency Smoke Coordinator (602- 771- 2356)
- National Park Service, Intermountain Region Fire Operations , Denver, CO, Information Officer (303- 969- 2948)

Other Federal Agencies
- Southeast Arizona Zone Coordination Center
- Federal Aviation Administration
- Arizona Interagency Smoke Coordinator
- Davis- Monthan Air Force Base, Flight Operations Center

Arizona State Agencies
- Arizona State Land Department, Division of Fire Management
- Arizona Department of Environmental Quality, Arizona Interagency Smoke Coordinator

City/County Governments
- Pima County Air Quality, Airshed coordinator
- Pima County Board of Supervisors
- Pima County Sheriff's Office & Emergency Services
- City of Tucson, Mayor and Council
- Other interest groups as appropriate (hiking clubs, neighborhood groups)

Standard Outline of Contents for a Permanent Project Record for Wildland Fire Use
The centerpiece of the permanent record is the DI- 1202, Individual Fire Report. The full record retained at the park (and staff responsible) will include:

- DI- 1202 (FMO)
- All narratives (FMO)
- WFIP (FMO)
- Daily and spot weather forecasts (Fuels Specialist)
- Smoke monitoring and permits (Fuels Specialist)
- Map showing daily acreage burned (Fire Ecologist)
- Total cost summary (Fire Program Assistant)
- Monitoring data (Fire Ecologist)

Prescribed Fire

Prescribed burning allows meeting resource management and safety objectives on a predictable timetable. Saguaro National Park has been conducting prescribed burns since April 1984. The burning program is both a means and an end; theoretically prescribed burning pre- treats the landscape to prepare for the return of fire as a natural process, but it also becomes the process when lack of ignitions and restrictive conditions keep wildland fire

use from taking place. Prescribed fire compensates for ignitions outside the park that might naturally move into the park but are instead suppressed. All prescribed fire must meet the requirements of the interagency IPRG.

The Prescribed Fire Burn Plan is the site- specific implementation document that defines the strategic purpose, goals, and objectives for each prescribed fire project. It also provides guidance for developing the Incident Action Plans (IAP) that defines tactical activities for each operational period needed to execute the prescribed fire project. A Prescribed Fire Burn Plan is required for each prescribed fire project. All Prescribed Fire Burn Plans must be reviewed and recommended by a burn boss qualified at or above the complexity level of the project. The plan receives further review by the interdisciplinary team composed of Fire Management staff and representatives of the Resource Management Division.

Planning and Documentation
Annual Activities
The Fuels Specialist oversees the following annual planning activities:

Monthly: Submit prescribed fire/fuels reduction accomplishments to the National Fire Plan Operations & Reporting System (NFPORS) within a week of completion or by the 23rd of the month.

March 15: Set prescribed burn priorities and prepare NFPORS request for next fiscal year's prescribed burns. Initiate seasonal collaboration with partners.
September 1: Submit burn schedule to Arizona Department of Environmental Quality.
November 1: Receive notice of budget approval from the Intermountain Region Office (IMRO).
Ongoing: Collaborate with interagency contacts; conduct interagency planning.

The park's five year prescribed burn projects are included in Appendix X. All burning is currently planned for FMU 1.

Table IV- 4 describes general staff responsibilities for prescribed fire. The *Adequate Holding Resources Worksheet* specifies numbers and types of personnel required for each fire and is an attachment to each burn plan. Personnel and other resource requirements vary with fuel conditions, season, weather, and burn duration. As park staff members change, assignments and responsibilities may shift to other qualified personnel, possibly in another NPS office or at a different level in the organization.

Behavior and effects for all fires will be monitored in accordance with the Fire Monitoring Handbook (see Chapter VI for more details); the Fire Monitoring Plan, included in the EIS (Appendix II), dictated by RM- 18 Chapter 11 describing four monitoring levels—environmental planning, fire observations, immediate postfire effects, and long- term change.

Table IV- 4. Prescribed Fire Staff Responsibilities

Staff Member	Responsibility
	Planning
Fuels Specialist	Obtains funding for burn, writes burn plan, prepares documentation, obtains smoke permit and is RXB2 qualified
Fuels Specialist/Fire Ecologist	Assures NEPA, NHPA, ESA compliance
Fire Management Officer	Reviews burn plan for safety concerns and continuity
Superintendent	Approves Burn Plan
Chief of Ranger Services	Inform neighbors and other affected local parties of pending action
Fuels Specialist	Initiates burn plan peer review
	Execution
Fuels Specialist	Organizes logistics, orders equipment and resources, acts as/arranges burn boss, tracks costs, oversees monitoring
Fire Ecologist	Serves as resource advisor
Fire Management Officer	Serves as agency liaison
Chief of Ranger Services	Oversees safety and security of public
Interpretive Ranger	Informs visitors about project

Along with the overall program, monitoring program components are also evaluated annually:

- Gathering and processing data
- Evaluating results
- Analyzing and interpreting data
- Responding to an identified trend
- Documenting results
- Suggesting modifications to prescriptions for future prescribed burns

During a prescribed fire, weather observations are recorded every half hour by a qualified fire effects monitor: temperature, relative humidity, wind direction, wind speed, cloud cover, and dew point. Fire behavior observations are collected hourly or more frequently if circumstances dictate: rate of spread, flame length, residence time, and flame zone depth. Fuel moisture (10- hour TLFM) is measured at least twice during a burn and more frequently if
possible. Smoke data are collected every hour, and minimally include smoke column height and direction; more intense smoke monitoring occurs for burns in close proximity to heavy visitor use areas. Smoke data collection must meet current ADEQ standards.

Monitoring objectives are measurable, and include short- and long- term analysis of program effectiveness. Monitoring type descriptions are on file in the Resources Management office and include monitoring objectives for each monitoring type. These descriptions are reviewed on an annual basis for validity and changed as needed. Concerns related to this Fire Monitoring Handbook protocol include the time needed to evaluate program effectiveness and the appropriateness of these protocols to unique vegetation types. Further monitoring and evaluation information is included in Chapter VI.

Critiques, reviews, and evaluation of prescribed fire projects will follow the specified formats included in Chapter XI. The level of critique/review will depend on the size, complexity, and operational needs of the specific project.

A burn- boss trainee (RXB2) or higher level staff will prepare a prescribed fire plan preceding any burn. Sample contents from RM- 18 Chapter 10 Exhibit 15 are spelled out in Table IV- 5. All prescribed fire plans will fully address contingency measures should a prescribed fire escape. The plan must be approved by the Superintendent prior to the ignition of prescribed fires and must satisfy NEPA and NHPA requirements. It also requires technical review by a party outside the park. The Superintendent or burn boss may cancel an approved fire at any time. The burn boss must initial and date, and the Superintendent must sign, any modifications or amendments to an approved plan in advance of ignition. In addition, a minimum of the documents listed in Table IV- 6 will be maintained in files for each fire.

Historic fuel treatment

Figure IV- 1 shows past fire activities that effect future planned actions. A prescribed fire program began at Saguaro National Park in April 1984 with the ignition of the Chimenea Prescribed Fire. This fire, approximately 40 acres, was the beginning of a series of small burns through 1987. After the 1988 season, with the revision of all National Park Service Fire Management Plans, the prescribed fire program at the park was suspended. In 1991 the park's FMP was approved but the next prescribed burn did not take place until ignition of the Duckbill Prescribed Fire (100 acres east of Manning Camp). The Duckbill Prescribed Fire was the first in a five- year plan designed around the protection of Manning Camp. In 1996 the park successfully ignited two prescribed fires – the Meadow Prescribed Fire (July) and the Spud Rock Prescribed Fire (October) – totaling about 350 acres. The Devil's Bathtub Prescribed Burn was ignited in July and October in 1997 with a total of 550 acres receiving

Table IV- 5. Prescribed Burn Plan Contents

Section in RM- 18 Chapter 10	Title	Section in RM- 18 Chapter 10	Title
A	Signature Page	L	Ignition and Holding Actions
B	Executive Summary	M	Wildland Fire Transition Plan
C	Description of Prescribed Fire Area	N	Protection of Sensitive Features
D	Goals and Objectives	O	Public and Firefighter Safety
E	Risk Management	P	Smoke Management
F	Project Complexity	Q	Interagency Coordination and Public Information
G	Organization	R	Monitoring
H	Cost	S	Post Fire Rehabilitation
I	Scheduling	T	Post Fire Reports
J	Preburn Considerations	U	Appendices*
K	Prescription		

*Reviewer Comments, Technical Reviewer Checklist and Comments, Maps, Prescribed Fire Complexity Rating Worksheet, Fire Modeling Outputs, Agency Administrator Go/No- Go Pre- Ignition Approval, Prescribed Fire Operations Go/No- Go Checklist.

Table IV- 6. Minimum Required Prescribed Fire Documentation

Original signed prescribed fire plan	Agency administrator go/no- go approval
Checklist of pre- burn activities	Operational go/no- go checklist
All reviewer comments	Incident action plan(s)
All maps	Unit logs, daily validation, other unit leader documentation
Notification checklist	Press releases, public comments, complaints
All permits (burn, smoke, others)	Smoke dispersal information
Monitoring data	Post- fire analysis
Weather forecasts	DI- 1202 (must also be reported in SACS and NFPORS)
	Photographs

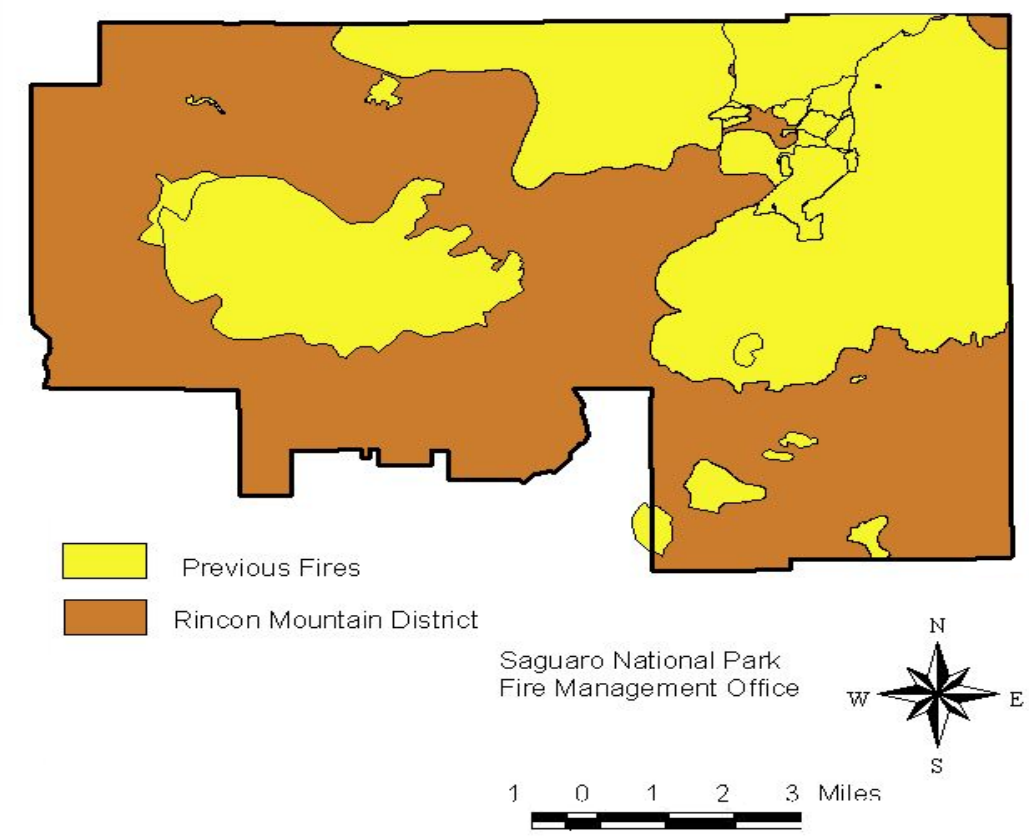

Figure IV- 1. Past Fire Activities at Saguaro National Park

treatment. The last prescribed fire – the Chimenea – was ignited in October 1998 and was the largest prescribed fire at 2,000 acres to date for the park. The Chimenea Prescribed Fire completed the original hazard reduction plan for Manning Camp.

Prescribed Fire Plan Contents

A standard prescribed fire plan form has been developed for use in the NPS. However, due to the variety of information required by an individual park unit the plan may be supplemented with additional content provided the minimum elements listed in the standard form are addressed. Table IV- 5 lists the minimum elements that each Prescribed Burn Plan shall include. Complete descriptions can be found in RM- 18 Chapter 10.

Exceeding Existing Prescribed Fire Burn Plan

If a prescribed fire exceeds prescriptions to the point where on- scene resources are incapable of controlling it, the fire will be declared a wildland fire and staff will develop a WFSA. In these situations, staff will follow procedures as outlined in RM- 18 Chapter 9, in addition to specific guidelines listed in the Prescribed Burn Plan.

Air Quality and Smoke Management

By virtue of its 1976 wilderness designation, Saguaro National Park is officially designated a Class I airshed under the Clean Air Act Amendments of 1977. Preventing deterioration of air quality in this area includes practical considerations that result from the adjoining Tucson metropolitan area, which significantly impacts air quality throughout the Tucson Basin. Smoke resulting from wildland and prescribed fires will be managed to comply with all local, state, and federal air quality regulations. This most stringent air quality classification is aimed at protecting national parks and wilderness areas from air quality degradation. Due to the location of FMU 1, smoke generally travels away from the Tucson basin. The park, in implementing its wildland fire use and prescribed fire programs, develops prescriptive conditions that aim to control smoke emissions for minimum impacts. The ADEQs Air Quality Division (AQD) implements a Smoke Management Plan that works toward a reduction in smoke impact due to prescribed/controlled burning of nonagricultural fuels, with particular regard to heavy forest fuels. All state lands, parks, and forests, as well as any federally managed lands in Arizona, are under the jurisdiction of ADEQ in matters relating to air pollution from prescribed burning (A.A.C. R18- 2- - 15(g)).

Pertinent air quality issues

Smoke from wildfires and prescribed burning is a complex mixture of carbon, tars, liquids, and gases. The major pollutants are particulates, volatile organic compounds (VOCs), and carbon monoxide (CO). Nitrogen oxide (NO_x) is also produced, but in a relatively small quantity when compared to other pollutants. Particulates can remain suspended in the atmosphere for a few days to several months, and can reduce visibility as well as contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can also result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion. Table IV- 7 displays the estimated average annual emissions resulting from all wildland and prescribed

fires which occur in Saguaro National Park. These estimates will vary depending upon actual acres, weather conditions, moisture found in the fuels, and type of fire applied to the fuels.

Location of Class I airsheds

The Arizona Smoke Management Map (Figure IV- 2) shows the three Class I areas in the Southeast Zone of Arizona: Saguaro National Park, the Gailuro Wilderness, and Chiricahua Wilderness. The Galiuro Wilderness Area is about 40 air miles northeast of Saguaro, while the Chiricahua Wilderness lies about 80 air miles east- southeast of Saguaro. With favorable atmospheric conditions during burn episodes at Saguaro, these two wilderness areas are likely to have no effect from smoke.

Pre- identified smoke sensitive areas

Smoke sensitive areas found around Saguaro National Park include the Tucson metropolitan area, which includes the towns of Vail and South Tucson. Several other small unincorporated areas are found within a 40- mile radius with potential to be affected by smoke from fires in Saguaro. These include, Benson, Corona de Tucson, Casas Adobe, as well as the town of Marana. The Rillito Non- attainment Area is about 40 air miles northwest of Saguaro and is another potentially smoke sensitive area.

Local and regional smoke management restrictions and procedures

Saguaro National Park must register and obtain approval for all planned burn projects, including areas for potential wildland fire use. Burn plans shall be submitted annually detailing all planned prescribed burns. Each planned year extends from August 1 of the registration year to July 31 of the following year; the resource manager may amend a registration at any time. The Fuels Specialist will submit documentation listed below to both AQD and ADEQ.

Smoke Mitigation

Fire occurrence in the Rincon Mountains is cyclic, occurring primarily during the summer thunderstorm season (June – Sep). The annual average fire suppression acres (in all vegetation zones combined) is historically between 0 and 1,300 acres. The annual average acres of wildland fire use historically range from 0 to 603 acres. During years when wet weather conditions prevail, the number of wildland fire use acres would be negligible. Historically average broadcast prescribed fire treatments range from 0 to 250 acres. Table IV- 7 displays the amount of smoke emitted from fires of these acreage.

Table IV- 7: Maximum Annual Smoke Emissions

Average Annual Emissions (tons) Assuming 100% Crown Consumption, Ponderosa Pine Vegetation, and Maximum Annual Average Acres				
Fire Type	**Average Annual Acres**	**PM10**	**PM2.5**	**CO**
Suppression	1,300 acres	551	551	3,382
Wildland Fire Use	603 acres	362	362	2,220
Prescribed Fire	250 acres	164	164	1,004

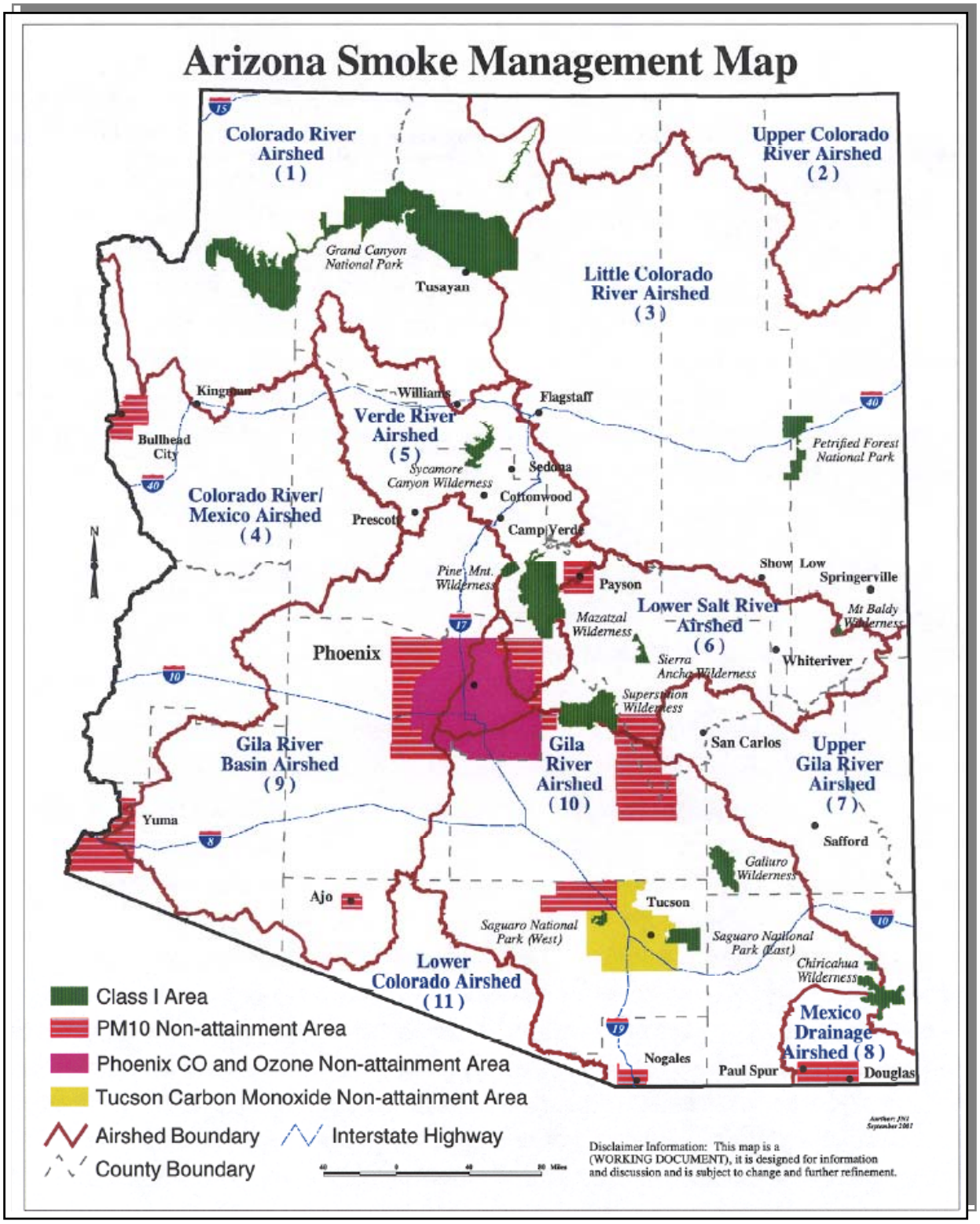

Figure IV- 2. Arizona Smoke Management Map showing Class I Airshed Areas

Smoke mitigation measures include:

- Burn Concentrations – sometimes concentrations of fuels can be burned rather than using fire on 100 percent of an area requiring treatment. The fuel loading of the areas burned using this technique tends to be high. This can also apply to areas that have "jackpots" of fuels or broadcast slash burns (slash that has not been piled).
- Isolate fuels – large logs, snags, deep pockets of duff, sawdust piles, squirrel middens, or other fuel concentrations that have the potential to smolder for long periods of time can be isolated from burning (reducing the area burned). This can be accomplished by several techniques including: 1) constructing a fireline around fuels of concern, 2) not lighting individual or concentrated fuels, 3) using natural barriers or snow, 4) scattering the fuels, and 5) spraying with foam or other fire retardant material. Eliminating these fuels from burning is often faster, safer, and less costly than mop- up, and allows targeted fuels to remain following the prescribed burn.
- Mosaic burning – landscapes often contain a variety of fuel types that are noncontiguous and vary in fuel moisture content. Prescribed fire prescriptions and lighting patterns can be assigned to use this fuel and fuel moisture non- homogeneity to mimic natural wildfire and create patches of burned and non- burned areas, or burn only selected fuels. Areas or fuels that do not burn do not contribute to emissions.
- Site Conversion – natural site productivity can be decreased by changing the vegetation composition lessening the need to burn as often.
- Having high moisture content in non- target fuels – this can result in only the fuels targeted being dry enough to burn.
- High moisture in large woody fuels – burning when large- diameter woody fuels (three-plus inch diameter or greater) are wet can result in lower fuel consumption and less smoldering.
- Mass ignition/shortened fire duration/aerial ignition – "mass" ignition can occur through a combination of dry fine- fuels and rapid ignition, which can be achieved through the use of a helitorch. The conditions necessary to create a true mass ignition situation include rapid ignition of a large open area with continuous dry fuels.
- Rapid mop up – rapidly extinguishing a fire can reduce fuel consumption and smoldering emissions somewhat, although this technique is not particularly effective at reducing total emissions and can be expensive.
- Burn before precipitation – scheduling a prescribed fire before a precipitation event will often limit the consumption of large woody material, snags, stumps, and organic ground matter, thus reducing the potential for a long smoldering period and reducing the average emission factor.
- Burn before green up – burning in cover types with a grass and/or herbaceous fuel bed component can produce fewer emissions if burning takes place before these fuels green-up for the year.
- Burn before litter fall– underburning before deciduous trees and shrubs drop their leaves reduces ground litter that contributes extra volume to the fuel bed.
- Backing fire – flaming combustion is cleaner than smoldering combustion. A backing fire takes advantage of this relationship by causing more fuel consumption to take place in the

flaming phase than would occur if a heading fire were used. Backing fires do burn with more heat intensity, and resource objectives must be balanced with smoke concerns.
- Dry conditions – burning under dry conditions increases combustion efficiency and fewer emissions may be produced.

All prescribed burning and debris disposal would comply with regulations contained in the Arizona State Department of Environmental Quality Smoke Management Plan. A prescribed burn plan would be prepared for each project. These site- specific plans would include all of the required elements listed in RM- 18.

The FMP complies with Federal and State regulations governing air pollution and smoke management and all applicable NPS policies and guidelines related to wildland fire management and ecosystem health.

Annual Air Quality and Smoke Management Activities

- **Annual prescribed burn registration** form submitted by September 1st
- **Smoke modeling** runs using Simple Approach Smoke Estimation Model (SASEM) that calculates fuel consumption, particulate emissions, and dispersion of particulate matter produced by prescribed burning.
- **At least 14 days prior to ignition**: ADEQ burn plan
- **By 2 pm the day prior to ignition**: Smoke dispersion map, with location of burn relative to locations of smoke- sensitive areas, Class I areas, or non- attainment areas within 15 miles in any direction of the project.
- **Every day ignition is planned**: Daily Burn Request (cannot submit one request for entire burn duration). Separate requests for Saturday, Sunday, and Monday may be sent via fax to AQD at one time, but are separate pieces of paper. AQD will either post approval on their website, call with approval, or fax it to the park on the same business day as the Burn Request submittal. All smoke permit approvals are also posted on the USFS Southwest Area Fire website. A "no reply" from AQD is an approval to burn. Only a statement of disapproval can prevent or stop an ignition.
- **By 2 pm on the day following an approved ignition**: Daily Burn Accomplishment form. Include successive acreage covered and Best Management Practices (BMP) used.

I- 209s in Arizona must now contain a description of the fuels burned that date and the number of acres in the narrative.

Non- Fire Fuel Treatment Applications

Mechanical and manual treatments complement prescribed burning to reduce fuels that might sustain large- scale, high- intensity fires. Such treatment requires a NEPA, NHPA, and Superintendent- approved plan that becomes a project statement in the NCRMP.

Mechanical Treatment and Other Applications

Annual activities to prepare for and implement the program

- Ensure that approved burn/implementation plans are on file
- Ensure that all NEPA, NHPA and Endangered Species Act compliance is completed
- Obtain smoke permits if fuel piles will be burned
- Contract mechanical treatment projects with non- government organizations when feasible
- Monitor mechanical treatment units for ecological effects and program effectiveness

Equipment and seasonal use restrictions by FMU

- Chainsaws may be used, on a limited basis, in the park's MSO PACs during breeding season (March 1- August 31) upon consultation and approval from Science & Resource Management
- Chainsaws may be used in designated wilderness based on consultation, completion of minimum tool analysis, and approval from the Superintendent

Required effects monitoring including short and long term monitoring objectives

Monitoring of mechanical treatment units will follow the Fire Monitoring Handbook; plots will be installed according to established protocols and read on the established monitoring schedule. Objectives can then be quantitatively measured to determine whether they have been met for each treatment unit. If after the initial treatment the unit is determined to require additional treatment to meet objectives, or if the objectives have changed after initial treatment, monitoring will continue on the established schedule.

Format for critiques of mechanical treatment projects

Critiques, reviews, and evaluation of mechanical treatment projects will follow the specified formats included in Chapter XI Fire Critiques and Annual Plan Review. The level of critique/review will depend on the size, complexity, and operational needs of the specific project.

Cost accounting

Planning, implementation, contracting, and equipment/supply costs will all be tracked throughout the treatment to determine cost/acre for each unit.

Reporting and documentation requirements

Report of completion, cost/acre, and other relevant information will be entered into the NFPORS. Documentation requirements will follow that for prescribed fire projects.

Annual planned project list

Saguaro National Park does not plan on any major mechanical projects in the next several years, but will follow the above protocols in the event a project is identified. Currently the use of mechanical treatment is limited to pre- burn preparation of identified prescribed fire units, and is generally carried out on the perimeter of the unit to prevent escapes and mitigate hazards.

Emergency Rehabilitation and Restoration

Planning and implementation of post- fire emergency rehabilitation and restoration will follow guidelines set forth in the Interagency Burned Area Emergency Stabilization and Rehabilitation (BAER) Handbook as well as RM- 18 Chapter 12 Burned Area Emergency Rehabilitation. Immediate or short- term actions to prevent unacceptable resource damage and minimize threats to life and property resulting from a wildland fire will be part of the cost and responsibility of the incident management organization.

BAER plans and requests for funding must be submitted to the IMRO within five days of fire control. IMRO will review the plan and requests within 7 days of receipt and may transfer these documents to the Fire Management Program Center for review, depending on cost.

Saguaro National Park will use the least intrusive BAER actions to mitigate actual or potential damage caused by wildland fire. The preferred action will be natural recovery of native plant species, except in rare circumstances. BAER actions for fire use and prescribed fires are inappropriate and will not be utilized.

Chapter V: Organizational and Budgetary Parameters

Organization

Fire management is a Division (Division of Fire and Aviation) within the park (Figure V- 1). The Division is responsible for management of all wildland and prescribed fire and aviation operations at Saguaro National Park. Table V- 1 lists the roles and responsibilities of the fire management staff in the park. Further descriptions of key personnel roles relative to fire operations can be found in Chapter IV under "Staffing and Criteria for Implementing and Managing WFURB."

FIREPRO Funding

The budget process for the wildland fire funds is handled in a similar process for all parks. Fire management funding for the NPS is derived from two sources:

- FIREPRO funds are managed through annual operating program accounts or through project work accounts, depending on the activity. Activities covered include preparedness activities, permanent staffing, training, monitoring, and equipment purchases. FIREPRO is intended to identify the minimum acceptable standards that each park fire management program should achieve. The FIREPRO analysis would be used as a vehicle for seeking adequate funding to implement these standards.

- Wildland Fire Operations funds within the NPS portion of the Department of Interior firefighting account could be insufficient to cover expenditures for suppression, severity, rehabilitation, and hazard fuels management during severe fire years. For these situations, the NPS would first request that the department transfer wildland fire management funds from other bureaus or, if these funds were exhausted, use the emergency authority under Section 102 of the general provisions of the Interior Appropriations Act to transfer funds from other programs. The NPS would then seek to restore funds to affected programs through a supplemental appropriation.

The park superintendent is responsible to periodically assess and certify by signature that continued management of wildland fire use actions is acceptable. The park superintendent under certain conditions may delegate this responsibility to another organizational level.

Interagency Coordination

Saguaro's Branch of Fire Management works closely with federal, state, and local cooperators in the planning and implementation of the park's fire management program. Saguaro is a member of the Southeast Arizona Zone in addition to USFS– Coronado National Forest, Bureau of Land Management – Safford District, U.S. Fish & Wildlife Service – Buenos Aires and San Bernardino NWR, Bureau of Indian Affairs –Tohono O'odham and White Mountain Apache, Arizona State Land Department – Tucson Office, and numerous local fire departments.

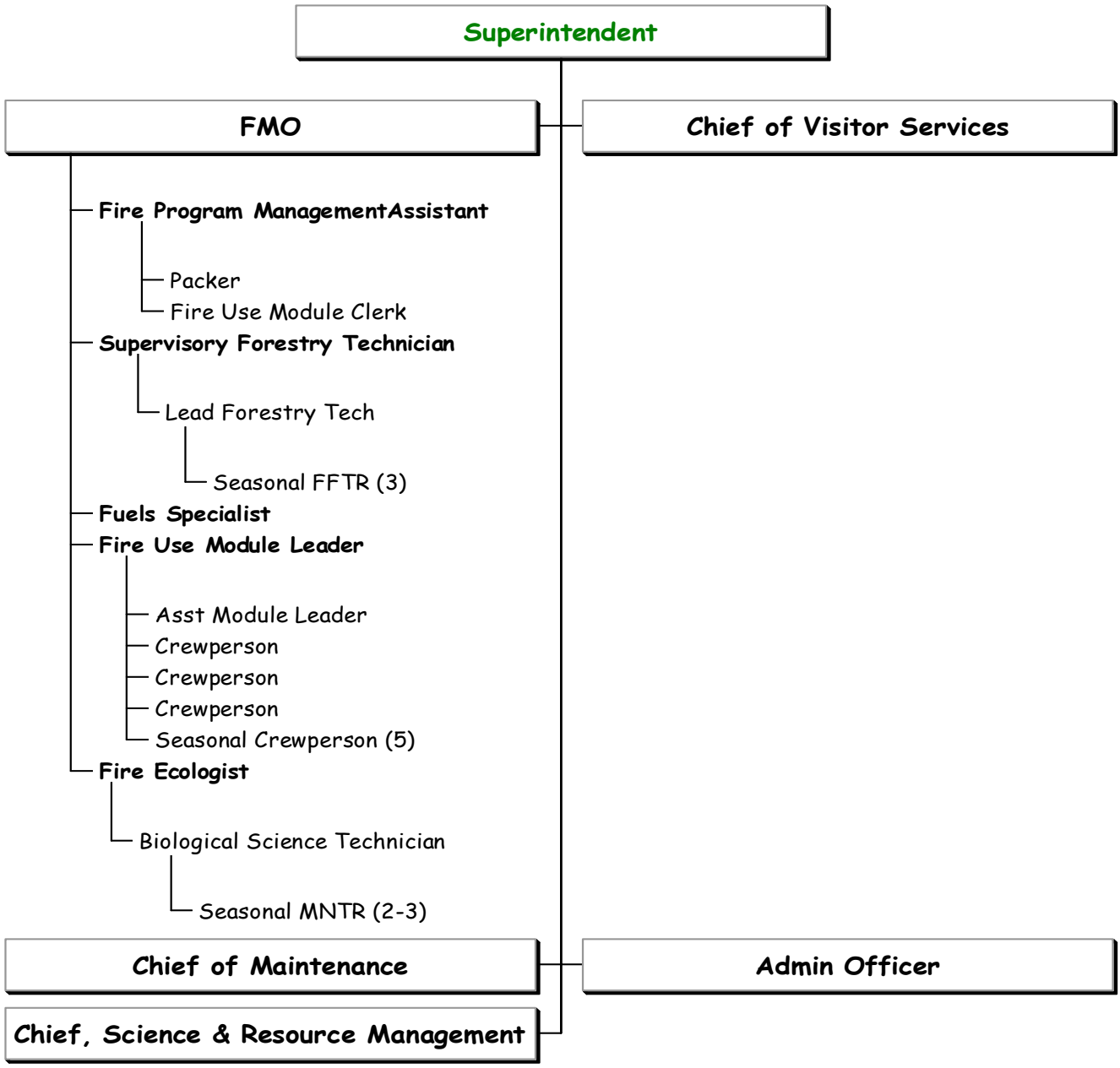

Figure V- 1. Fire Management Organization in Saguaro National Park

Table V- 1. Fire Management Roles and Responsibilities

The **SUPERINTENDENT** has responsibility for wildland fire management within the park. *The Superintendent is responsible for signing the periodic assessment to certify that wildland fire use actions are acceptable and may be continued.* The Superintendent may, under certain conditions, delegate this responsibility to another organization level.
The **FIRE MANAGEMENT OFFICER (FMO)**, by delegation of authority, is responsible for planning and implementing a safe, effective, and efficient fire management program to meet management objectives. In addition, provides support to Coronado Nat'l Memorial, Tumacácori Nat'l Historic Park, Organ Pipe Cactus Nat'l Monument, Casa Grande Nat'l Monument, Tonto Nat'l Monument, Montezuma Castle Nat'l Monument, and Tuzigoot Nat'l Monument.
The **FUELS SPECIALIST** is responsible for identifying, planning, implementing, and recording all prescribed fire operations; the position coordinates program components with a variety of staff specialists in the various divisions within the park as well as federal, state, and local cooperators. The Fuels Specialist serves as the Acting Fire Management Officer when the FMO is out of the park.
The **FIRE ECOLOGIST** is responsible for coordinating the branch's program and project objectives with the Fuels Specialist and staff specialists in the Division of Science and Resources Management. The Fire Ecologist coordinates with federal, state, and local agencies, as well as academic institutions, such as the University of Arizona. The Fire Ecologist is also responsible for the supervision of the Lead Fire Effects Monitor and the fire effects monitoring operations.
The **FIRE USE MODULE LEADER** is responsible for day- to- day operation of the park's Fire Use Module and the supervision of the Assistant Fire Use Module Leader and Career Seasonal Crewmembers assigned to the Fire Use Module. The Fire Use Module is stationed at Saguaro, but is a national resource available to assist other NPS Units as well as other land management agencies with wildland fire use and prescribed fire.
The **SUPERVISORY FORESTRY TECHNICIAN** is responsible for management of the park's helibase, fire caches, remote automated weather station, and preparedness equipment. The position also supervises the Lead Forestry Technician in the day- to- day management of the park's Initial Attack Crew during the fire season.
The **FIRE PROGRAM MANAGEMENT ASSISTANT** is responsible for the administrative operations and fire business management of the Branch of Fire Management. These responsibilities include the supervision of the Packer and Fire Program Clerk (fire use module). In addition, provides administrative and fire business support to Coronado Nat'l Memorial, Tumacácori Nat'l Historic Park, Organ Pipe Cactus Nat'l Monument, Casa Grande Nat'l Monument, Tonto Nat'l Monument, Montezuma Castle Nat'l Monument, and Tuzigoot Nat'l Monument.
The **CHIEF OF VISITOR SERVICES** is responsible for the park's interpretive/public information program. The position serves as the primary information officer for the

park during fire operations. The position is also responsible for the park's law enforcement/emergency services program. Coordinates with the Fire Management Officer/Incident Commander on all public safety issues during fire operations.
The **ADMINISTRATIVE OFFICER** is responsible for the administrative activities in the park and supports the fire management program as a member of the park's Leadership Team during fire operations.
The **CHIEF OF SCIENCE AND RESOURCE MANAGEMENT** is responsible for the management of the park's resource management activities, including vegetation monitoring and rehabilitation, wildlife monitoring, research permits, and compliance. Supports the fire management program as a member of the park's Leadership Team during fire operations.
The **CHIEF OF MAINTENANCE** is responsible for all maintenance activities in the park and supports the fire management program as a member of the park's Leadership Team during fire operations.

Key Interagency Contacts

Saguaro works closely with the Coronado National Forest due to the common boundary on the east side (Rincon District) of the park. Key contacts for the management of the fire programs in both agencies include:

- Chuck Scott, Fire Management Officer, Saguaro National Park, 733- 5130
- Dean McAllister, Fire Staff Officer, Coronado National Forest, 670- 4528
- Rocky Tow, Fire Management Officer, Santa Catalina Ranger District, Coronado National Forest, 749- 8700
- Pete Schwab, Forest Aviation Officer, Coronado National Forest, 670- 4528

Interagency Agreements

Table V- 2 lists the fire related interagency agreements associated with Saguaro National Park.

Table V- 2. Fire- related Interagency Agreements

Saguaro National Park Fire- Related Agreements			
Title of Agreement	**Agency**	**Purpose of Agreement**	**Status of Agreement**
Interagency Agreement, 1443IA8670- 95-001	USDA, USFS, Coronado National Forest	Mutual cooperation and coordination in the management of wildland fires.	Revision and signature required.
Interpark Agreement, December 2000	CAGR, CORO, MOCA, ORPI, TONT, TUMA, TUZI	Provides professional and technical support for the fire management programs at all Southern Arizona units.	Agreement expires November 30, 2005.
Southeast Arizona Zone Charter (MOU)	Arizona State Land Department (Tucson District), USFS, BLM, Bureau of Indian Affairs – Tohono O'odham and San Carlos Agencies, and USFWS	Establishes an interagency board with the overall responsibility of coordinating the fire management activities of those agencies represented in the Zone.	Revision and signature required.
Interagency Agreement, 1443-IA- 1200- 98- 003	Arizona Department of Environmental Quality (ADEQ)	Maintains current air resource and interagency smoke management program in Arizona.	Modules 1 & 2 of 1998 original IA remains valid; however, a revision of this IA is under development based on the new ADEQ Guidelines approved in Spring 2004.
NOTE: Copies of all agreements are included in Appendix XI.			

Chapter VI: Monitoring and Evaluation

All NPS units that implement prescribed fire activities must develop short- and long- term monitoring programs to assess accomplishments and to determine the effects of management activities on park resources. Each park that implements wildland fire use activities must provide for the documentation of weather and fire behavior parameters that occur. While the fire management program is based on a broad array of scientific research that clearly illustrates the important role of fire in the parks' ecosystems, monitoring is essential to provide information about the effects of management activities.

Monitoring of fires, both wildland and prescribed, involves the systematic collection and recording of data on fuels, topography, weather, air quality, and fire behavior. Monitoring at Saguaro National Park generally follows the protocols outlined in the *National Park Service Fire Monitoring Handbook*. A fire- monitoring plan is a required element in National Park Service fire management plans. The *Saguaro Wildland and Prescribed Fire Monitoring Plan* found in the 2004 EIS (Appendix II) provides detailed descriptions and additional protocols for wildland and prescribed fires. The fuels and ecology group within the park's Division of Fire and Aviation will complete this monitoring with assistance provided by other park staff as needed.

Short- and long- term vegetation monitoring objectives applicable to a specific burn area would be stated in the prescribed fire plan. At a minimum, monitoring would comply with the protocol identified in the *National Park Service Fire Monitoring Handbook*. Data collected from short- term monitoring would be attached to the fire report along with any narrative completed by the prescribed fire monitors.

Monitoring includes pre, during, and postfire documentation, and includes documentation of fire location, weather characteristics, fire behavior, smoke dispersal, and the effects of fire on vegetation and fuels. Agency guidelines direct that all prescribed fires be monitored. The goals of the fire monitoring program are to:

- Verify that prescribed fire program objectives and goals are being met through documentation and analysis of fire effects data and using the data to determine if changes in burn prescriptions are needed.
- Perpetuate a working relationship between fire management and resource management in the developing of fire monitoring goals.
- Increase knowledge of fire behavior and effects on the park's ecosystems.
- Use the standard FMH program at a minimum.
- Document fire behavior and weather data for all prescribed and wildland fires and keep all data organized and accessible.
- Identify areas in which research/monitoring should be initiated.
- Provide historic and administrative data for fires within the park.

Information from other monitoring efforts will be used to inform the fire management program where pertinent. For example, results from the parks' Inventory and Monitoring Program may be useful to assess the changes occurring in areas of the park affected by wildland fires and areas where fire has been excluded for long periods.

Routine Monitoring
The majority of routine fire related monitoring is accomplished using information provided through the Southwest Area Wildland Fire Operations website, http://svinet2.fs.fed.us/r3/fire. Fire weather is collected by the Remote Activated Weather Station (021207 – Rincon) hourly. Weather information from the station is transmitted, via satellite, and is available on the Weather Information Management System (WIMS). The Southeast Arizona Zone Office reviews the weather and enters the 1300 hour weather on a daily basis. From this input the National Fire Danger Rating System (NFDRS) indices are generated, providing fire management with fire weather risk factors. Weather and fire danger indices are retrieved from the National Park Service Fire Management Website (http://data2.itc.nps.gov/fire/index.cfm) and used in daily planning.

Information on air quality, fuel moisture, and general conditions are available on the Southwest Area Wildland Fire Operations website (http://svinet2.fs.fed.us/r3/fire/swapredictive/swaweather/swaweather.htm). This site also provides vital links to the National Weather Service – Tucson Office, Arizona Department of Environmental Quality, as well as other federal and state partners.

Fuel moisture samples are collected, during the fire season, by the park's Initial Attack Crew during rotations at Manning Camp. These fuel samples are processed and provide actual fuel moisture information which is used in planning of prescribed fires and management of wildland fire.

Compliance Monitoring
Standardized protocols adopted by the USFWS are used in the park to monitor for listed species. Mexican Spotted Owl is a focus species for Saguaro National Park, as this species occupies nesting habitat within the wildland fire use zone and within some prescribed burn units. The park staff cooperates in the surveys necessary to fulfill obligations to the ESA for any endangered species affected by fire management activities.

Standard protocols do not necessarily indicate annual monitoring/census of known populations or new survey areas.

Cultural Resources Monitoring
The NPS recognizes that the effects of fire and the thresholds for unacceptable damage to some types of cultural resources (e.g., archaeological resources) are not well understood. An ongoing effort to obtain baseline information and develop this understanding would make it possible to refine sound risk management for fire planning. Monitoring the effects of fire in field situations would be an important component of this work. However, until systematic

laboratory experiments can be conducted, field- based fire effects monitoring would be limited to empirical observations. For resources such as cultural landscapes, systematic fire effects monitoring would focus on indicators or criteria for landscape restoration and maintenance. Outlined below is the minimum level of effort for monitoring the effects of fire on cultural resources at Saguaro National Park. This monitoring would provide feedback on the effectiveness of current resource protection measures, such as site avoidance and pre-burn fuel load reduction. It would be designed to document pre- and post- burn resource conditions that are readily observable, such as preservation of flammable historic fabric, preservation of milling slicks on archaeological sites, visually identifiable changes in surface artifacts and surface conditions, and changes in landscape conditions in historic districts and cultural landscapes.

As systematic processes for evaluating fire effects evolve, monitoring would be revised to support field evaluation. In the interim, cultural resource specialists (usually archaeologists from the NPS Western Archaeological Conservation Center) would identify any necessary pre- burn mitigation for prescribed fires, resource protection measures, and the most appropriate monitoring strategy for planned burns. In general, these would consist of the following:

- *Pre- burn*
  Known cultural resources will be relocated and current conditions assessed using standard operating procedures. This will include documentation of current fuel loads, predicted duration and intensity of a fire, threats to features and artifacts, and potential for subsurface impacts through burning roots and stumps. These data will be assessed to determine: (1) which protection measures should be implemented (if any); (2) the potential for fire effects studies; and (3) additional monitoring needs.

- *During Burn*
  For all fires, a Resource Advisor or Technical Specialist would provide recommendations to park managers. Although this would be primarily for resource protection, it would also provide documentation of fire behavior and immediately observable effects of fire in and adjacent to cultural resources. If suppression or holding actions were to be taken, the Resource Advisor would monitor as needed to advise on site- specific actions.

- *Post- burn*
  An archaeologist, as made available by outside funding, will revisit known cultural resources in burn areas to document any changes in condition and assess post- burn protection needs. Fire effects on cultural resources will be documented and subsequently added to the park's database on the effects of fire and fire management activities on cultural resources. Burn prescriptions and techniques used to protect cultural resources will also be refined.

For unplanned fire occurrence a qualified cultural resource advisor would be used to provide expertise for mitigating impacts from suppression activities.

Chapter VII: Fire Research

Previous and Ongoing Fire Research

Research priorities are identified by the Division of Fire and Aviation working in close cooperation with the Division of Science and Resources Management. In addition, Saguaro National Park maintains communication with the NPS Intermountain Region and Southern Arizona Office Division of Resource Management, as well as researchers at the University of Arizona and Northern Arizona University. The current prescribed fire program is based on research carried out in Saguaro National Park and in surrounding areas of Southern Arizona over the past few decades. The fire program encourages and seeks out research opportunities relating to fire that will aid the park in making better informed resource management decisions.

Several studies address the historic role of fire and fire ecology in Saguaro National Park. A study by Pamela Swantek et al. in 1999 reviews how Anglo settlement in the area brought about several land use changes that were major influences on the natural fire cycle. These land use changes include cattle ranching, fire suppression, and the introduction of invasive plant species. Cattle ranching included a large amount of grazing in the desert grassland and desert scrub areas of the park. In fact, the cattle density was so high that the vegetation was unable to support the cows and massive die- offs occurred. The cattle ate fine fuels that would have carried low intensity fires. Before Anglo settlement brought cows to the area, fires burned through the area frequently, keeping the woody shrubs in check and maintaining the grasslands. Without historic fire frequency, woody shrubs began to encroach on the desert grasslands. Another factor affecting the fire frequency in the grasslands was the successful implementation of fire suppression in the late 1800s. Written policy was to extinguish all detected fires. Without fire, there was nothing to keep the woody shrubs in check and they continued to encroach on the desert grassland areas. The last factor effecting natural fire cycle was the introduction of invasive grass species. These species were planted as food sources for cattle and to stabilize soil. The invasive grasses out- competed the native grasses and encouraged a fire cycle that was not common or beneficial to the native species. The invasive species would carry fire more readily and would come back more quickly after a fire had carried through the area. Non- native grasses have brought fire into upland desert areas that may not be adapted to regular fire.

Chris Baisan conducted a study in 1990 in the Mixed Conifer vegetation type that reports on the pre- 1900 fire history. This study is discussed in further detail in Chapter III under "Historic Role of Fire in FMU 1."

Research conducted in 2003- 2004 on sampling techniques for predicting fire extent, by Calvin Farris of the Laboratory of Tree Ring Research at the University of Arizona, shows that the data from Baisan (1990) is reliable and representative of the mountain as a whole. Like the Baisan study, the Farris study also focuses on elevations above 4,500 ft in the Rincon Mountains, but sampled 64 additional plots. Using the same dating technique as the Baisan

study, Farris took tree cross sections and recorded the fire scars. He then compared the fire scars dating from the 1900s with actual recorded fire events from the same periods. The preliminary data, being submitted for peer review in August 2004, shows that the major fire years taken from the tree cross sections were consistent with the current data of recorded major fire events in the 20th century. Farris concluded that the technique is reliable. Therefore, the data presented in the Baisan report can be used to reconstruct the actual extent of historical fires. In addition, the Farris study expanded the sample plots using the same technique, showing that the data presented in the Baisan report is also applicable to the entire mountain. Finally, Farris came to the same conclusion about fire season being predominately in the late spring and early summer (Farris pers. comm.).

Fire Research Needs

Saguaro National Park is without a Cultural and Natural Resource Management Plan that would summarize fire research needed to implement or refine the fire management program. However, the park recognizes that further research is beneficial. The park intends to pursue or continue pursuing the following investigations in order to refine and properly implement the fire management program:

- Study effects of the non- native Lehmann lovegrass *(Eragostis lehmanniana)* on native plant populations and the natural fire regime
- Document changes in hydrology caused by fire suppression
- Update the park's vegetation map
- Continue to monitor the Helen's Dome, Spud Rock, Reef Rock, and Rincon Peak PACs for the presence of Mexican spotted owls and survey additional areas where prescribed burning will likely occur

Chapter VIII: Public Safety

Public Safety Issues and Concerns

The RMD has the majority of fire activity but has a lower probability of conflicts with public safety compared with the TMD. Eighty- four percent of the fires occurring in the RMD over the last sixty- two years have occurred above 4,500 ft – well above any developments, roads, or major trail use areas. In addition, elevations above 4,500 ft receive relatively low visitation from June through August, the period of time of the greatest number of fires. Of the 16% of the fires which occurred below 4,500 ft (see Table III- 5), the majority were insignificant threats to park or private developments, roads, or major trail corridors.

The fire management program needs to effectively manage wildland fire and provide for the protection of life, property, and cultural resources, while ensuring the perpetuation of park ecosystems and natural resources. The FMP identifies objectives and actions to safely execute a full- spectrum, comprehensive fire management program. Safety is the responsibility of all personnel assigned to wildland and prescribed fire operations and must be promoted at all levels.

Mitigating Procedures

Public safety concerns will be specifically addressed in WFIP, WFSA, and Prescribed Fire Plan, as described in Chapter IV. The Chief of Visitor Services and the FMO will take the following public safety measures on all fires:

- Public safety messages will be incorporated into the processes of fire information dissemination. During incidents, more aggressive contact methods (door- to- door, information stations, and bulletin boards) will be used in targeted or at- risk neighborhoods.
- Trails and campgrounds in the vicinity of wildland fires and prescribed fires will be evaluated for closure if potentially hazardous conditions are present.

Further, the Division of Fire and Aviation at Saguaro National Park will:

- Educate employees and the public about the scope and effect of wildland fire management, including fuels management, resource protection, prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
- Maintain the highest standards of professional and technical expertise in planning and safely implementing an effective wildland fire management program.
- Protect life and property and accomplish resource management objectives.
- Assign Safety Officers when an incident exceeds type four management (initial attack) or has more than 25 people assigned.

Chapter IX: Public Information and Education

Public Information Capabilities

For years the NPS has promoted the prevention of human- caused fires, the interpretation and understanding of the role of lightning- caused fire, and fire as part of the natural ecosystem. As a result of these efforts, the general public and media have acquired a more widespread acceptance of fire management programs. To build on these positive results, the following measures will be implemented:

- Information explaining the fire management program will, as subject matter and seasonality permit, be incorporated into interpretive programs, exhibits, videos, and nature walks.
- The park Information Officer or Incident Information Officer will issue news releases and other media products about all significant prescribed and wildland fires.
- The Division of Fire and Aviation will coordinate efforts with the Division of Interpretation in the development and maintenance of site bulletins, brochures, off-site presentation, and public service announcements presenting the goals and objectives of the fire management program.

Step- up Public Information Activities

Due to the proximity of the park to the Tucson metropolitan area it is necessary to have a very aggressive and proactive information/interpretation program. When a new start is designated for wildland fire use or a prescribed fire project is initiated, a fire information organization will be activated. The level of activity will be based on fire location, size, expected duration, and resource commitment. The first operational period is considered the most critical time, and if the information program gets off to a good start, there are fewer problems later.

The FMO, Chief Ranger, and Park Information Officer will meet after the initial designation of a wildland fire in order to determine the most appropriate information and interpretive needs. In order to cover the information and interpretive needs, the Chief of Interpretation and Information Officer will insure that the following steps are taken:

Initial Action

- Obtain briefing from Incident Commander or FMO covering the current situation, fire direction, size, location, expected duration, resources committed, resource threats, anticipated closures, and plan of action.
- Inform media of wildland fire activity - size, direction of spread, location, expected duration, resources committed, and any anticipated restrictions or closures.
    - Prepare 'draft' release and media press, reviewed by FMO and approved by the Superintendent, for immediate release discussing the fire(s), objectives of the operation, size(s), location(s), expected duration, resources committed, and any anticipated restrictions or closures.

- Assign Field Information Officers as required by the operation, or requested by Incident Commander or FMO.
    - Insure that Field Information Officers are briefed on current and projected situation.
    - Insure that information center (area) is established where visitors, employees, and other individuals may follow the progress of the fire situation.
- Assign Interpreters, as required, to provide increased visitor information services in the affected district relating to the prescribed fire operation.
- Provide briefing to cooperating agencies (USFS, State of Arizona, County, City) on fire situation.

Operational Period Activities
In addition to the above, the following actions will be taken by the Assigned Information Officer or the Park Information Officer:

- Attend daily briefing at designated place and time for updates.
- Establish schedule and location for briefings with the media.
- Establish with the Incident Commander, or FMO guidelines for access by the media to the fire area(s).

Chapter X: Protection of Sensitive Resources

Archeological/Cultural/Historic Resources

Archeological sites

Elevations below 4,000 ft in the RMD have been designated as the Rincon Foothills Archeological District on the National Register of Historic Places. Because the archeological sites at Saguaro lack significant burnable resources (such as wooden beams), fire is not a great threat to these sites. However, fire suppression activities that disturb the soil can be a significant threat. The location of nearby archeological sites should be identified on every fire incident and the consulting archeologist should be advised so that appropriate precautions can be taken. The Cultural Resource Matrix (see Table IV- 3) should be consulted for mitigation and strategies before every planned action and during any unplanned action.

Natural Resources

Cactus ferruginous pygmy- owl (endangered)

General biology*:* Although historic accounts associated this subspecies with riparian woodlands and mesquite bosques in Arizona, recent sightings of cfpos in the state have generally been in the Arizona upland subdivision of the Sonoran desertscrub and in the paloverde cacti mixed scrub series. To date there has only been one cfpo detection in the park resulting from intensive local surveys; it occurred in a remote part of the RMD on October 1, 1995.

Compliance*:* The park does not have any fire projects planned for areas with suitable cfpo habitat. It is being discussed for two reasons: 1) Cfpo's are a very high- profile issue in Tucson, and 2) exotic grasses are increasing in cfpo habitat and creating conditions favorable to fire in non- fire- adapted plant communities.

Lesser long- nosed bat (endangered)

General biology*:* Bat surveys in Saguaro National Park have confirmed a small (<5 since 1991, when they were discovered) colony of lesser long- nosed bats below 4,000 ft in the RMD. Therefore, we presume this species is foraging in the dense saguaro stands of the RMD early in the summer, and perhaps using agave flowers found at higher elevations in this district (3,000 ft– 7,000 ft) later in the year. Lesser long- nosed bats have not been detected in the TMD and there are no known maternity roosts in the vicinity of the park.

Compliance: At Saguaro, until we locate additional roosts, the main concern with lesser long-nosed bats is foraging habitat (i.e., saguaros and agaves). To the extent a project might affect saguaros or agaves (as in a burn), this impact to habitat must be assessed.

Mexican spotted owl (threatened)

General biology*:* The Mexican spotted owl (MSO) is one of three spotted owl subspecies, and is listed as threatened by both the USFWS and the AGFD. In southern Arizona they typically occur in mixed- conifer, Madrean pine- oak and Arizona cypress forests, encinal

oak woodlands, and riparian forests. Nest sites are generally located in closed- canopy forests or steep- walled canyons. Prey items recorded in southern Arizona include small mammals, bats, birds, reptiles, and invertebrates. Reproductive chronology also varies across the subspecies range, with eggs generally being laid in early April and hatching in early May; young birds fledging in mid- June and dispersing in mid- September to early October. In the Rincon Mountains, young owls fledge in July, and leave their home ranges in September. Several surveys for Mexican spotted owls have been conducted in Saguaro National Park since 1992. In 1996, five pairs were documented within the park (four on Mica Mountain and one on Rincon Peak) and PACs were established for each of them.

Compliance*:* MSO compliance is also very high- profile, and the Recovery Plan, which the USFWS uses as a compliance reference, is very detailed and specific about impacts to owls and habitat, and how to quantify them. Any project above 6,000 ft in the park should be assumed to require MSO compliance. This entails knowing the status of potentially affected MSOs/PACs and how they may be impacted, especially during the breeding season (March – August.). Time must be allowed for ascertaining the breeding status of the affected birds/habitat, writing a BA and for the USFWS to review the BA. MSOs at Saguaro are generally affected by fire management activities and trail work.

Desert Tortoise

General biology*:* Tortoises are found at relatively high densities in Saguaro National Park (Averill- Murray and Swann 2002). Although individuals in the park have been reported at elevations as high as 7,000 ft (Asland et al. 2002), actual populations probably are all below 4,840 ft in elevation (Wirt and Robichaux 2001). The absence of literature dealing either peripherally or specifically with fire effects on the desert tortoise may indicate that it has not been a concern. Spring and summer fires may be most detrimental to the tortoise because they rely on grasses for forage during this time. Winter fires may be less harmful because tortoises hibernate then and are not dependent on available food.

Compliance*:* The park does not have any fire projects planned for areas where tortoises are found. It is discussed here due to the fact that tortoises are an issue of local concern and exotic grasses are increasing in tortoise habitat and creating conditions favorable to fire in non- fire- adapted plant communities. Suppression of fires at lower elevations (below 5,000 ft) would be sufficient to protect desert tortoises in the park.

Lowland Leopard Frog

General biology*:* The lowland leopard frog is a species of concern in Arizona. Breeding habitat has been greatly reduced by groundwater withdrawal in the Tucson Basin, and many populations in remote canyons have experienced high mortality from multiple causes during recent years. Breeding habitat for these frogs in the park is limited to a small number of perennial pools in about five drainages in the Rincon Mountains. Past wildland fires have been known to result in the filling of these pools with sediment, eliminating perennial water and (in at least one case) eventually eliminating frog populations. The Chiva Fire resulted in silting in one of the large tinaja in Wildhorse Canyon (above Garwood Dam). The Box Canyon Fire resulted in silting in of the pools in Loma Verde Creek (east of Stop 6), and in

parts of the Box Canyon drainage as well. The amount of sediment is related to fire severity, percentage of watershed burned upstream of pools, and intensity of rain events in the months and years following fires. Rincon Creek, Madrona Creek and Chimenea Creek contain the best remaining breeding pools and must be protected from increased sedimentation to ensure the frog's survival in the park.

Compliance: Long- term prevention of degradation or loss of leopard frog habitat can probably best be achieved by reducing fuel loads through prescribed fire, wildland fire use, and other means. Suppression of wildland fires in areas where fuel loads are high, especially during the very dry pre- monsoon period, may be necessary to prevent severe fires that burn over a large percentage of a particular watershed. This concern is addressed in individual WFIP.

Peregrine falcon
General biology*:* This bird was delisted by the USFWS in 1999. However, this designation calls for federal agencies to monitor peregrine populations for the next five years. This falcon is primarily a hunter of small to medium- sized birds often associated with water (e.g., waterfowl, shorebirds, swallows, etc). Its most important habitat characteristic is the presence of tall cliffs (typically over 150 feet but sometimes as low as 60 feet). Peregrines nest on ledges, potholes or in small caves on sheer cliff faces that are relatively inaccessible to mammalian predators and that also provide protection from weather extremes. Four known peregrine eyrie sites exist at Saguaro National Park, all in the RMD and all in remote backcountry areas.

Compliance*:* Any activity or project that will occur within a mile of a known nest site should be assessed for potential impacts to peregrines, especially if it occurs in the breeding season (March – June). At Saguaro, they are most likely impacted by fire management activities and trail work. The park makes one trip per year to Mica Mountain to check on the status of the pair of peregrine falcons that is known to be there. They time this monitoring trip to coincide with the predicted appearance of fledglings.

Gila topminnow (endangered fish, extirpated at Saguaro)
General biology*:* Apparently Gila topminnows were found in tinajas in Wildhorse drainage of the RMD in 1987. It is unknown if this was a natural or introduced population. By 1994, these fish were apparently extirpated; however, AGFD and USFWS have designated this site as a potential site for the reintroduction of topminnow and/or to establish a replicate for a nearby local population.

Compliance*:* Any action that may affect this drainage in a way that could affect its suitability for future reintroduction of topminnow must be assessed in a BA.

Saguaro Cactus
General biology*:* Fire top- kills saguaro, and it may kill existing seedlings. Because there is a time lag between time of injury by fire and time of death, post fire mortality may be

underestimated. Small saguaro, less than 6.6 to 13 feet tall, with large amounts of fuel at the plant base do not survive. Larger saguaro may survive with limited exposure to fire.

Compliance*:* Any activity or project that will occur within the Sonoran Desert Scrub should be assessed for potential impacts to saguaros. At Saguaro National Park, wildland fire and associated suppression activities impact them. Management and resource advisors should take extra care in briefing fire crews on Minimum Impact Suppression Techniques (MIST) to avoid any unnecessary damage to saguaros and their habitat. Fires in this vegetation type should be actively suppressed using MIST techniques.

Chapter XI: Fire Critiques and Annual Plan Review

All wildland and prescribed fires will be reviewed in accordance with DO- 18 (1998) and RM-18, Chapter Thirteen, Evaluation and Review (1999). The authority to convene a fire review rests with the park superintendent, regional director, or the Associate Director, Park Operations and Education. It is the clear responsibility of the park superintendent to call for a review, to insure timely completion, and to implement recommended actions. The regional director has responsibility to follow- up with the park superintendent that reviews are established and completed in a timely manner, and that recommended actions are completed. The park superintendent may request technical support from Fire Management Program Center, regional, park or interagency personnel with the appropriate expertise.

The review will be coordinated by the FMO, no later than 30 days after the fire is declared out. If the review requires technical support from Fire Management Program Center, regional, park or interagency personnel with the appropriate expertise, the FMO will coordinate the review within a reasonable timeframe.

Reviews are conducted for one or more of the following purposes:

- To examine the progress of an on- going fire incident and to confirm effective decisions or correct deficiencies.
- To identify new or improved procedures, techniques or tactics.
- To compile consistent and complete information to improve or refine park, regional or national fire management programs.
- To examine anomalous fire- related incidents in order to determine cause(s), contributing factors, and where applicable, recommend corrective actions. If negligence is indicated, the circumstances will be reported and investigated in accordance with applicable regulations, policies or guidelines.
- To determine the cost effectiveness of a fire operation.

Fire Reviews

Agency Administrator Review (AAR)

The purpose of the AAR is to examine the progress of an on- going fire incident, regardless of size. The review will provide a confirmation of the decisions being made daily in the WSFA or determine where the decision process has been faulty and corrective actions are needed. The AAR is normally conducted by the park's FMO (or an official who has designated fire program management responsibilities) in conjunction with the incident commander on the fire. These reviews require no special reporting. Documentation of AARs should be included in the normal fire report narrative.

Incident Management Team (IMT) Closeout and Review

The park superintendent will conduct a closeout review with the IMT prior to their release from the fire incident. The purpose of this review is to ensure complete transition of the

incident management back to the park and to evaluate the status of any incomplete fire business.

Park Level Review
The superintendent or his/her designated representative should conduct the park level review. The superintendent will appoint other qualified persons, including the park FMO (or an official who has designated fire program management responsibilities) to be a part of the review. The purpose of this review is to provide the superintendent with information to recognize commendable actions and to take needed corrective action(s).

Costs associated with the review will be charged to the account assigned to the fire with the approval of the regional FMO. A copy of the complete report will be sent to the regional FMO, who will review it and, if appropriate, forward a copy to the Fire Management Program Center.

Regional Level Review
A regional level review may be conducted for any fire that:

- Crosses a park boundary into another jurisdiction without the approval of an interagency agreement.
- Results in adverse media attention.
- Involves serious injury to less than 3 personnel, significant property damage, or an incident with potential.
- Results in controversy involving another agency.

The regional level review normally will be conducted at the park where the fire occurred. The regional FMO or his/her designated representative will convene it. The superintendent of the park will attend it as well as the park's FMO (or the official who has designated fire program management responsibilities), the incident commander(s) for the fire, and other individuals agreed upon by the regional director and superintendent. The review should follow the Interagency Standards for Fire and Fire Aviation Operations, Chapter 19, Reference Manual 18, and the other current requirements.

If possible, the review team should visit the actual fire site as part of the review. A copy of the review report will be sent to the Fire Management Program Center. Costs associated with the review will be charged to the account assigned to the fire.

National Level Review
A national level review may be conducted for any fire that involves Servicewide or national issues, including:

- Significant adverse media or political interest.
- Multi- regional resource response.
- A substantial loss of equipment or property.
- A fatality, or multiple, serious fire- related injuries (three or more personnel).

- Any other fires that the Associate Director, Park Operations and Education, wants reviewed.

The national level review normally will be conducted at the park where the fire occurred. The National FMO or his/her designated representative will convene it. It will be attended by the superintendent of the park, the park's FMO (or an official who has designated fire program management responsibilities), the regional FMO, the incident commander(s) for the fire, and other individuals agreed upon by the National FMO, the regional director and the superintendent.

If possible, the review team should visit the actual site of the fire as part of the review. All costs associated with the review will be charged to the account assigned to the fire.

Annual Review of the Fire Management Plan
The FMP is guided by the overall resource management objectives for Saguaro National Park. The annual review will focus on the operations, strategies, responsibilities, and coordination of the fire management program. If the NEPA, section 106 of NHPA, and Section 7 of ESA associated with the plan are still adequate compliance documents, then the Superintendent has the authority to approve changes to the plan to keep it updated.

The FMP is intended to be a functional, working document for the wildland fire program. The FMO will coordinate an annual review of the Plan. The review will be documented by superintendent's signature showing the appropriate date. Any amendments to the plan will be reviewed and approved by the Superintendent through a signed administrative action. A comprehensive revision of the FMP will be completed on a five- year schedule beginning on the date of the final approval signature.

Pre/Post- Season Fire Management Reviews
Prior to April 1st each year the FMO will conduct a pre- season briefing with all interested park staff and interagency cooperators.

Prior to December 1st each year the FMO will conduct a post- season review with all interested park staff and interagency cooperators.

The FMO will develop an agenda for the meetings and distribute 1- week prior to each meeting.

Operations Evaluations
Operations evaluations of parks and regions may include review of fire management programs to assure compliance with established NPS standards.

Annual Fire Program Review
The Associate Director, Park Operations and Education, will convene an ad- hoc team to review Servicewide fire activity during any year in which significant, unusual or controversial

fire activity occurs. This review team should analyze the reports from national level reviews and appropriate regional level reviews to determine what, if any, policy or operational changes should be initiated. The review team will develop findings and recommendations and establish priorities for action.

FIREPRO Review
Periodically, national and regional fire management staff conduct FIREPRO audits and reviews of parks and regional/support office programs.

Chapter XII: Consultation and Coordination

National Park Service Saguaro National Park	
Bob Lineback	Rincon District Ranger
Bob Love	Chief Ranger
Chuck Scott	Fire Management Officer
James Leckie	Biological Technician
Kathy Schon	Fire Ecologist
Mark Holden	Resource Management Specialist
Matt Daniels	GIS Specialist
Meg Weesner	Chief of Science and Resource Management
Natasha Kline	Resource Management Specialist
Pat Haddad	Fire Program Assistant
Paula Nasiatka	Chief Ranger
Rob Martin	Supervisory Forestry Technician
Sarah Craighead	Superintendent
Steve Grater	Fire Use Module Leader
Todd Roeder	Rincon District Ranger
Tom Danton	Chief of Interpretation

Western Archeological & Conservation Center Tucson	
Sue Wells	Archeologist
Margi Brooks	Landscape Architect

University of Arizona Tucson	
Cori Dolan	School of Natural Resources
Brooke Gebow	School of Natural Resources

U.S. Fish & Wildlife Service Ecological Services Phoenix and Tucson	
Mark Crites	Biologist- Tucson
Steve Spangle	Field Supervisor- Phoenix

Intermountain Regional Office	
Lisa Hanson	NEPA/Sec 106 Specialist
Linda Kerr	Regional Fire Ecologist
Cliff Chetwin	Regional Aviation Manager
Cay Ogden	Wildlife Ecologist and T&E Coordinator

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Appendix II. Environmental Impact Statement

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Appendix III. Park Prevention Plan

Wildland Fire Prevention and Community Education

Saguaro National Park is dedicated to providing high- quality fire information and education for as many people as possible while maintaining a level of service that demonstrates the parks' professionalism. Based on the ecological principles and operational procedures outlined in this Fire and Fuels Management Plan, the Fire Information and Education (FI&E) Program has three goals:

GOAL #1 – To provide year- round education on fire ecology and fire history of southern Arizona. Communicate how fire and fuels management practices meet natural resource management goals and thus the mission of the NPS.

GOAL #2 – To provide accurate and timely incident information for local, regional, and national fire operations as needed.

GOAL #3 – To provide local communities, park residents, and park permitees with information on fire safety, fire prevention, defensible space, and fuels management.

The FI&E Program will emphasize the major goals of the FMP to increase public awareness and support. While there are a variety of fire strategies and tactics used in the park, the fire program's overarching goal is to reduce hazardous fuels and restore natural resource conditions. The park will not interpret the concepts of prescribed fire separate from wildland fire use, suppression, or mechanical treatment since it is the combination of all four strategies that supports the parks' program.

Similarly, the FI&E Program will provide the public with unique fire information based on data specific to this park. Saguaro visitors want to connect with the park and the fire story here, not with generic messages about fire ecology nationwide. The park will generate interpretive stories for the public while maintaining a level of sophistication appropriate to the topics of fire ecology, fire history, research, monitoring, operations, safety, and fire prevention.

The parks have identified five target audiences for fire information and education messages:

Park Visitors (including in- park visitors, internet visitors, and special groups)
Park Employees (including NPS and volunteers)
Local Communities (including residents, businesses near the park, civic groups, and clubs)
Students/Teachers (including K- 12 students, college students, elder hostel groups, and teachers)
Scientific/Professional Peers (including other federal, state, and county agencies, and professional associations)

Communication Methods

The following methods will be used to communicate with the five target audiences listed above. There are both personal (face to face) and non- personal methods which will facilitate reaching the greatest number of people.

Personal

- Interpretive Programs – Park staff will integrate fire messages into hikes, walks, campfire programs, and special off- site presentations. The FIO will audit these programs to ensure content quality.
- Education Programs – Park staff will incorporate fire ecology concepts into curriculum-based education programs, student field research experiences, after- school programs, and teacher workshops.
- Employee Training – The FIO will coordinate park- wide employee training sessions to improve staff understanding of the fire and fuels management program. These sessions will be open to NPS and volunteers.
- Roving – During fire operations, park employees will be stationed in high- use visitor areas, including trails, to answer questions about the current activity and/or explain the fire and fuels management program. Backcountry rangers will also provide information to backpackers about fire operations in their area.
- Conference Presentations – Park staff will give peer presentations at conferences about current fire research, planning, or operations. These presentations will share information, generate feedback, and ultimately improve SAGU's fire and fuels management program.
- Special Events – The park will, when possible, participate in local events to promote the fire and fuels program. For example, park employees can staff booths at local fairs or host community meetings.

Non- Personal

- Media Stories – The FIO will communicate with print, radio, and television outlets through press releases and interviews. When necessary, the FIO will facilitate special media projects (books, documentaries, etc.) by guiding research, scheduling interviews with park staff, and coordinating filming schedules.
- Printed Handouts – The park will include fire information in regular park publications (like the park newspaper). The FIO will research, write, and design, additional handouts specifically about fire management such as newsletters, student materials, and brochures.
- Visitor Center Exhibits, Waysides, and Bulletin Boards – The park will maintain and update the interpretive information in visitor centers and wayside exhibits on fire and fuels management. The FIO will maintain permanent and non- permanent bulletin boards both inside and outside the park.
- Webpage – The parks will maintain a fire and fuels management webpage, that is linked to the main park webpage, with fire planning documents, research papers, GIS maps, interpretive information, and photos.

- Scientific Papers – Park researchers will publish papers in scientific journals and/or periodicals regarding new information from SAGU's fire and fuels management program.
- Updates – The FIO will use email, fax, and bulletin boards to provide specific fire updates. In general, updates will appear as needed (perhaps bi- weekly during fire season) but during fire operations they will be released daily.

Evaluation

To maintain a successful FI&E Program, the parks will seek evaluation opportunities such as visitor/resident surveys.

The FIO will also evaluate the FI&E Program by preparing an annual report each year that documents the accomplishments by target audience. The park will forward this annual report to the IMR- Fire Management Officer and Communications/Education Specialist, and a copy to the NPS Fire Management Program Office in Boise, Idaho.

Appendix IV. Saguaro National Park Wildland Fire Implementation Plan

This implementation plan was developed through input from local experts and staff members at Saguaro National Park. The process described in the plan reflect specific concerns at Saguaro that have come about from past fire events that caused adverse effects to specific habitats/perennial water sources found in the park. The purpose of the plan is to avoid these adverse effects in the future by developing mitigation measures in the form of a step by step guide and go- no- go gauge.

The Wildland Fire Implementation Plan is a three- stage process, and is completed based on the level of risk that is associated with the fire. A wildland fire may be managed under any of the stages and need not have all stages completed.

Stage I – Initial Fire Assessment. Stage I is a decision- making process to evaluate new fire starts and assess ongoing wildland fires in the park. It establishes the foundation information critical to manage the fire, and provides the information for the initial Go/No- Go decision. Stage I consists of two distinct components. Table 1 breaks down the elements required for the *Fire Situation Information*, and the *Initial Go/No Go Decision*.

Table 1

Stage I Fire Situation Information	Initial Go/No Go Decision
Fire name	Is there a threat to life, property, or resources that cannot be mitigated?
Fire number	Are potential effects on cultural and natural resources outside the range of acceptable effects?
Jurisdiction(s)	Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?
Administrative unit(s)	Is there other proximate fire activity that limits or precludes wildland fire use?
Fire Management Unit (FMU)	The Decision criteria above is a process to assess whether or not the situation warrants continued wildland fire use implementation. A "yes" response to any element on the checklist indicates that the appropriate management response should be suppression- oriented.
Geographic Area(s)	
Management Code(s)	
Start date/time	
Discovery date/time	
Current size	
Location	
Cause	
Fuel model(s)/conditions	
Current weather	
Forecasted weather	
Current fire behavior	
Forecasted fire behavior	
Availability of resources	
Decision criteria checklist	
Recommended response action	

In addition to the general information, Table 2 will serve as a guideline for starts occurring pre- monsoon and after the monsoon pattern has been established. In addition, Table 2a will be referenced for target environmental conditions upon a pre- monsoon ignition. These guidelines will be considered during the initial fire situation and effect the go/no go decision.

Table 2

Stage 1 Guideline

- If a pre- monsoon ignition occurs that meets the defined prescription (table 2a), is above 6,000', and is in an area that has been treated with fire in the last 10 years……...Go
- If a pre- monsoon ignition occurs below 6,000' …….NoGo[1]
- If a post monsoon ignition occurs above 4,500' in elevation ..... …..Go

Table 2a

Pre- Monsoon	Temp (°F)	Relative Humidity (%)	Wind Direction	Energy Release Component	1000- hr TLFM
May 1st – July 3rd	≤ 105	≥ 15	WSW, W, WNW, N, S	≤ 25 FM C	≥ 8

Once the fire is authorized to burn it must be periodically re- assessed to confirm the continued capability to manage the fire. This must be completed regardless of whether the fire is in Stage I, II or III of the planning process. This is done based on a set time schedule not to exceed at least once every 7 days. During periods of active growth this process is done daily. This revalidation consists of completing a revalidation checklist (Fig 4) and assessing the need to perform additional planning by moving to Stage II or Stage III. The re- validation process requires a signature by the agency administrator (Superintendent).

Stage II – Short- Term Implementation Actions. Stage II represents the initiation of management for resource benefits. During this stage, the potential fire behavior is calculated; uncertainty is reduced by assessing risk (Fig 1) of the fire, how quickly it could spread, what the projected final fire size will be, how many (total) acres in the park have been burned year-to- date, projected affect on major drainages (below 6,000') and how intense the fire may burn; fire complexity; necessary immediate and short- term management actions and resources; and evaluation of the need to move directly to Stage III.

1. If an ignition occurs between 5,000' and 6,000' with a projected growth limited to uphill spread because of topographic features or fuels, the ignition may be considered for Wildland Fire Use.

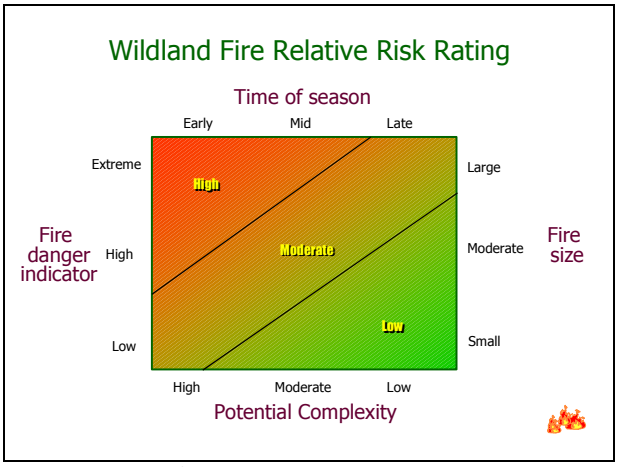


Figure 1 Wildland fire relative risk rating chart

- Stage II consists of four distinct components: *Fire Behavior Predictions and Risk Assessment, Short- term implementation actions, Complexity Rating Worksheet,* and *Stage III Needs Assessment.*

- Fire Behavior Predictions: generated through the Fire Behavior Prediction System (FBPS) using the BEHAVE system to obtain predictions of fire intensity and rate of spread based on fuel model, wind, topography, and fuel moisture conditions.
- Risk Assessment: A variety of techniques can provide specific estimates of degree of risk. Example products may include: probability of fire reaching Maximum Manageable Area (if MMA location is known from FMP), probability of a season- ending event, description or map of predicted fire perimeters The minimum risk assessment required is a relative risk chart output (Fig 1).
- Short- Term Implementation Actions: Developed from staff input, predicted fire behavior, risk assessment, fuel types, fuel continuity, overall objectives. Represents tactical implementation actions.
- Complexity Analysis: Developed from staff input and review of standard complexity elements.
- Stage III Need Assessment Chart: Determined from completion of relative risk, complexity rating, fire behavior predictions, and Fire Situation (Stage I).

Table 3 Guideline for implementation of stages II and III.

Stage II & III Guidelines

- Keep fire size below 3,000 acres for any one fire.
- Total acres burned for any one given year whether from Rx or Wildland Fire Use may be restricted to ≤ 5,000 acres.[2]
- Limit the % burned of any one major drainage below 6,000' in elevation to ≤ 25%. (see attached map)

2 This will be dependent on burn severity, location within the park, and time since last fire.

The Short- Term Implementation Actions: These actions can vary significantly, depending upon specific circumstances of the particular fire. In cases where the fire may be fuel- limited, surrounded by sparse fuels or natural barriers with only limited spread potential, monitoring may be specified as the necessary implementation action. In other cases, monitoring plus some form of limited mitigation actions may be necessary. In still other cases, fuel types in which the fire is burning may require immediate actions to delay, check, or direct the spread of fire. Stage II also describes what the initial or immediate implementation actions including:

- Objectives and Desired Effects
- Safety Considerations
- External Concerns
- Environmental Concerns
- Threats
- Short- Term Implementation Actions
- Estimated Costs
- Signatures

Complexity Analysis: Stage II requires that a Complexity Analysis (Fig 2) be completed which is an agency process involving worksheets that address issues related to safety, threats and potential for escape. Where risks are identified from this analysis, they are specifically addressed regarding the possibility to mitigate that risk. This is an evolving process but will include rating complexity elements including but not limited to:

- Fire Treatment Objectives
- Potential for Escape
- Life and Safety
- Values at Risk
- Fuels and Fire Behavior
- Management Organization
- Ecological and Environmental Considerations
- Social and Cultural Values
- Smoke and Air Quality Management
- Project Duration and Logistics

WILDLAND AND PRESCRIBED FIRE COMPLEXITY RATING WORKSHEET

Complexity element	*Weighting factor*	*Complexity value*	*Total points*
Safety	5		
Threats to boundaries	5		
Fuels and fire behavior	5		
Objectives	4		
Management organization	4		
Improvements	3		
Natural, cultural, social values	3		
Air quality values	3		
Logistics	3		
Political concerns	2		
Tactical operations	2		
Interagency coordination	1		

Total complexity points ☐

Complexity Rating (circle) **L** **M** **H**

Complexity Value Breakpoints:

Low	***40 - 90***
Moderate	***91 - 140***
High	***141 - 200***

The Wildland and Prescribed Fire Complexity Analysis provides a method to assess the complexity of both wildland and prescribed fires. The analysis incorporates an assigned numeric rating complexity value for specific complexity elements that are weighted in their contribution to overall complexity. The weighted value is multiplied times the numeric rating value to provide a value for that item. Then all values are added to generate the total complexity value. Breakpoint values are provided for low, moderate, and high complexity values.

The complexity analysis worksheet is accompanied by a guide to numeric values for each complexity element shown, provided on the following pages.

Figure 2 Complexity Worksheet

- Magnitude of Oversight/Political Activities
- Ignition and Tactical Operations.
- Interagency Coordination

Stage III Needs Assessment: This process is a chart (Fig 3) that provides the decision maker a visual aid to determine whether planning needs to proceed to the final level or whether management can continue at the Stage II level. It is currently based on comparing four elements to generate a visual indicator of where the fire is in relation to Stage III needs. The four elements are:

- Time of Season
- Documented or Potential Fire Behavior
- Complexity
- Relative Risk

All four of the above elements are known from completing the first two Stages of planning and are evaluated together to yield a visual aid which can help decide whether planning should proceed to Stage III. By matching indexes top and bottom and side to side in figure 3, the crossing point indicates the need to move to Stage III.

Stage III – Long Term Assessment and Implementation Actions. This is the final stage of the WFIP and its need is determined by the Stage III Needs Assessment Chart (Fig 3) or it can be ordered completed by the Agency Administrator (Superintendent). Stage III is normally completed on all fires that display potential for significant growth, have potential to threaten significant values, or have significant holding actions or resource commitment associated with their management. This stage is also normally always completed if a Fire Use Management Team is activated to manage the fire.

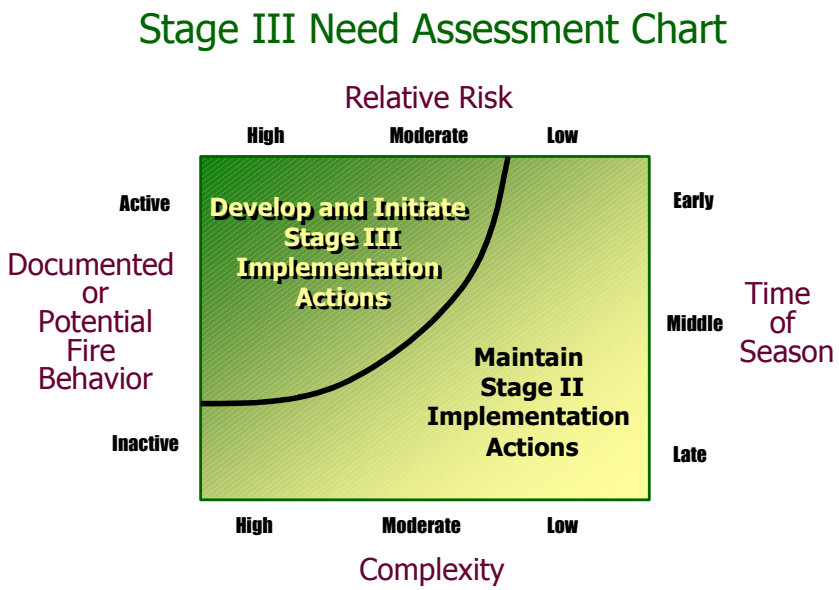


Figure 3

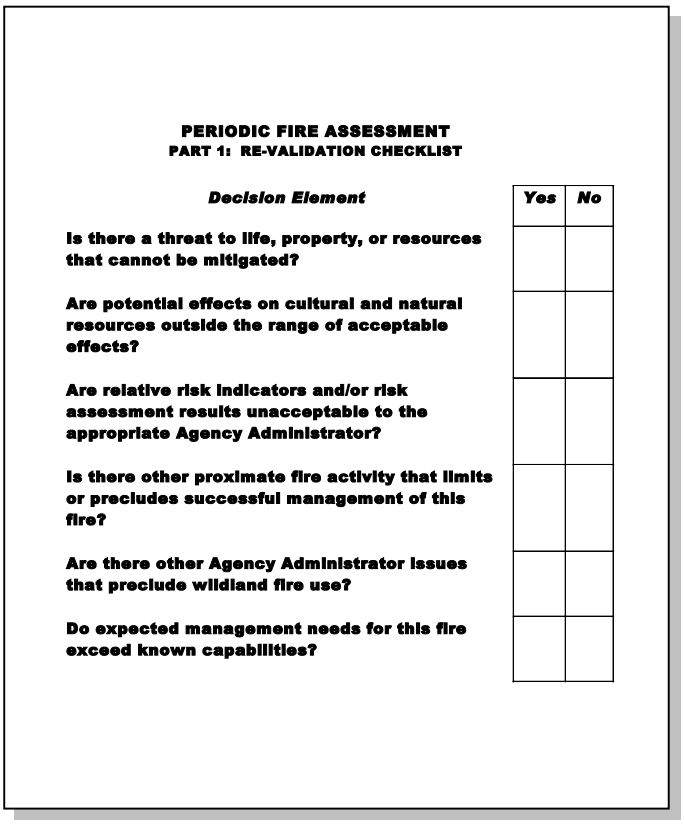
Stage III details operational activities and documents the planning completed to insure adequate mitigation actions have been developed. These actions will provide the best protection against fire activity exceeding acceptable limits. Mitigation actions are those on- the- ground activities that will serve to increase the

defensibility of the Maximum Manageable Area (MMA), check, direct, or delay the spread of fire, and minimize threats to life, property, and resources. Mitigation actions may include mechanical and physical non- fire tasks and specific fire applications. Their purpose is to construct firelines, reduce excessive fuel concentrations, reduce vertical fuel continuity, create fuel breaks or barriers around critical or sensitive sites or resources, create "blacklines" through controlled burnouts, and limited suppression actions to limit fire spread and behavior. There are 15 major components to Stage III of the WFIP:

Objectives and Risk Assessment Considerations

- Natural and Cultural resource objectives and constraints/considerations
- Maximum Manageable Area Definition and Maps
- Fire Projections and Maps
- Weather season/drought discussion and prognosis
- Long- Term Risk Assessment (describe techniques and outputs, include maps as appropriate)
- Probability of Success
- Threats
    - Threats to MMA
    - Threats to Public Use and Firefighter Safety
    - Smoke dispersion and effects
    - Other
- Monitoring Actions (actions, frequency, and duration)
- Holding Actions (describe holding actions, management action points that initiate these actions, and key to map if necessary)
- Resources needed to manage the fire
- Estimated costs of long- term implementation actions
- Contingency Actions (describe contingency actions, management action points that initiate them, and resources needed)
- Information Plan
- Post- burn evaluation
- Signatures and Date

Once again, the decision to manage a fire at Stage I, II, or III must be periodically re- assessed and validated by the agency administrator (Superintendent). This step provides a process to evaluate the continued capability of the local unit to manage the fire for resource benefits, and to determine if the fire is escalating in complexity and operational needs.



PERIODIC FIRE ASSESSMENT
PART 1: RE-VALIDATION CHECKLIST

Decision Element	*Yes*	*No*
Is there a threat to life, property, or resources that cannot be mitigated?		
Are potential effects on cultural and natural resources outside the range of acceptable effects?		
Are relative risk indicators and/or risk assessment results unacceptable to the appropriate Agency Administrator?		
Is there other proximate fire activity that limits or precludes successful management of this fire?		
Are there other Agency Administrator issues that preclude wildland fire use?		
Do expected management needs for this fire exceed known capabilities?		

Figure 4. The Periodic Fire Assessment is illustrated in the reduced format forms above.

Once the fire is authorized to burn, it must be periodically re- assessed to confirm the continued capability to manage the fire. This is done based on a set time schedule not to exceed at least once every 7 days. During periods of active growth this process is done daily. This revalidation consists of completing a revalidation checklist and assessing the need to perform additional planning. At Stage II the periodic re- assessment and re- validation requirement also requires that the chart (Fig 3) be evaluated each time the re- assessment is done. The re- validation process requires a signature by the agency administrator (Superintendent).

Copies of figure 2 and 4 may be obtained from the *Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide*.

Appendix V. Yearly Readiness Checklist

Fire Organization	
	Fire management plan current
	Park fire organization chart completed
	Supervision adequate/qualified
Administration	
	Physicals and physical fitness tests completed
	Fire qualification cards up to date
	Physical fitness program established
	Appropriate training conducted
	Quarters up to safety codes
	Interagency agreements current
	Accident reporting procedures in place
	Preparedness plan current
	Property accountability procedures in place
Facilities/Equipment	
	Weather stations maintained
	Tools maintained
	Saw and pump kits ready to use
	Personal protective equipment ready
	Operators trained in defensive driving
	Hose testing/hose rack in place
	Red tag system established for unsafe equipment
	Engines adequately maintained/equipped
	Preventive maintenance conducted on engines
	Replacement schedule established for equipment
	Roads, trails, signs posted
	Lookouts operational
	Fire caches in order
Fire Operations	
	Pre- season risk analysis conducted
	Communication equipment ready
	Communication plan in place for initial and extended attack
	Fire weather procedures established
	Fire operations plan current
	Dispatch plan current
	Prevention plan current
	Pre- attack plan current

	Structural protection plan current
	Step- up plan current
	Detection procedures current
	Local interagency cooperation arranged
	Fire investigation procedures established
	Wildland fire use/prescribed fire escape; fire transition to wildland fire suppression procedures current
Aircraft Use	
	Facilities adequate and inspected; helispots marked
	Fugitive retardant available
	Helitack training, drills current
	Flight routes established
	Restricted airspace indicated
	Crash/rescue plan updated and practiced
Significant Park Specific Issues	
Notes:	

Appendix VI. Incident Complexity Analysis Type 1 & 2

Incident Complexity Analysis
(Type 1, 2)

1) Analyze each element and check the response, Yes or No.
2) If positive responses exceed, or are equal to, negative responses within any primary factor (A through G), the primary factor should be considered as a positive response.
3) If any three of the primary factors (A through G) are positive responses, this indicates the fire situation is or is predicted to be of Type 1 complexity.
4) Factor H should be considered after numbers 1–3 are completed. If more than two of the items in factor H are answered yes, and three or more of the other primary factors are positive responses, a Type 1 team should be considered. If the composites of H are negative, and there are fewer than three positive responses in the primary factors (A- G), a Type 2 team should be considered. If the answers to all questions in H are negative, it may be advisable to allow the existing overhead to continue action on the fire.

Incident Complexity Analysis	YES	NO
A. Fire Behavior (Observed or Predicted)		
1. Burning index (from on- site measurement of weather conditions)		
predicted to be above the 90% level using the major fuel model in		
which the fire is burning.		
2. Potential exists for extreme fire behavior (fuel moisture, winds, etc.).		
3. Crowning, profuse or long- range spotting.		
4. Weather forecast indicating no significant relief or worsening		
conditions.		
Total		
B. Resources Committed		
1. 200 or more personnel assigned.		
2. Three or more divisions.		
3. Wide variety of special support personnel.		
4. Substantial air operation which is not properly staffed.		
5. Majority of initial attack resources committed.		
Total		
C. Resources Threatened		
1. Urban interface.		
2. Developments and facilities.		
3. Restricted, threatened, or endangered species habitat.		
4. Cultural sites.		

5. Unique natural resources, special- designation areas, wilderness.		
6. Other special resources.		
Total		
D. Safety		
1. Unusually hazardous fireline construction.		
2. Serious accidents or fatalities.		
3. Threat to safety of visitors from fire and related operations.		
4. Restrictions and/or closures in effect or being considered.		
5. No night operations in place for safety reasons.		
Total		
E. Ownership		
1. Fire burning or threatening more than one jurisdiction.		
2. Potential for claims (damages).		
3. Different or conflicting management objectives.		
4. Disputes over suppression responsibility.		
5. Potential for unified command.		
Total		
F. External Influences		
1. Controversial fire policy.		
2. Pre- existing controversies/relationships.		
3. Sensitive media relationships.		
4. Smoke management problems.		
5. Sensitive political interests.		
6. Other external influences.		
Total		
G. Change in Strategy		
1. Change in strategy to control from confine or contain		
2. Large amounts of unburned fuel within planned perimeter.		
3. WFSA invalid or requires updating.		
Total		
H. Existing Overhead		
1. Worked two operational periods without achieving initial objectives.		
2. Existing management organization ineffective.		
3. Overhead overextended mentally and/or physically.		
4. Incident action plans, briefings, etc. missing or poorly prepared.		
Total		

Appendix VII. Incident Complexity Analysis Type 3, 4, & 5

Incident Complexity Analysis (Type 3, 4, 5)		
	Yes	**No**
Fire Behavior		
Fuels extremely dry and susceptible to long- range spotting or you are currently experiencing extreme fire behavior.		
Weather forecast indicating no significant relief or worsening conditions.		
Current or predicted fire behavior dictates indirect control strategy with large amounts of fuel within planned perimeter.		
Firefighter Safety		
Performance of firefighting resources affected by cumulative fatigue.		
Overhead overextended mentally and/or physically.		
Communication ineffective with tactical resources or dispatch.		
Organization		
Operations are at the limit of span of control.		
Incident action plans, briefings, etc. missing or poorly prepared.		
Variety of specialized operations, support personnel or equipment.		
Unable to properly staff air operations.		
Limited local resources available for initial attack.		
Heavy commitment of local resources to logistical support.		
Existing forces worked 24 hours without success.		
Resources unfamiliar with local conditions and tactics.		
Values to be protected		
Urban interface; structures, developments, recreational facilities, or potential for evacuation.		
Fire burning or threatening more than one jurisdiction and potential for unified command with different or conflicting management objectives.		
Unique natural resources, special- designation areas, critical municipal watershed, T&E species habitat, cultural value sites.		
Sensitive political concerns, media involvement, or controversial fire policy.		

If you have checked "Yes" on 3 to 5 of the analysis boxes, consider requesting the next level of incident management support.

Appendix VIII. Delegation of Authority

Saguaro National Park
Tucson, Arizona

Delegation of Authority

As of _____, I have delegated authority to manage the _____ Fire, Saguaro National Park to Incident Commander _____. Your expertise in the management of wildland fires will assist Saguaro National Park in accomplishing stated land and resource management objectives. In order to carry out this responsibility, I want to ensure that you are aware of the following constraints and special concerns.

My objectives for this _____ are:

- Provide for fire fighter and Park visitor health and safety.
- All newly established fireline will be rehabed.
- _____
- _____
- _____
- _____

Considerations for management of the _____ fire are:
My resource advisors (READ) will be Restoration Ecologist, Danielle Foster or Biologist, Mark Holden or Biologist, Don Swann or Bio Tech, James Leckie. A READ will be contacted immediately after the fire is reported. If these designated READs are unavailable, contact the Chief of Resource Management, Meg Weesner, for an alternate. Consult the Resource Advisor Guide for Saguaro National Park located on the park network P:\Fire\resource_advisor if a READ is not available for initial attack.

	Office	Home	Cell
Danielle Foster	520- 733- 5187	520- 748- 7722	
Mark Holden	520- 733- 5173	520- 792- 1195	
Meg Weesner	520- 733- 5170	520- 290- 1723	
Don Swann	520- 733- 5177	520- 750- 0770	
James Leckie	520- 733- 5135		

Key resource considerations are:

* _____
* _____
* _____
* _____
* _____

* _____

Key cultural features requiring priority protection are:

* _____
* _____
* _____
* _____
* _____
* _____

Restrictions for management actions are:

* No tracked or wheeled vehicles in the wilderness.
* Leave standing snags unless they present a hazard to personnel assigned to the fire or future trail users.
* Manage any suppression activities to minimize deterioration of Park trails.
* Manage the fire with as little environmental damage as possible (use MIST techniques).
* Manage the fire cost- effectively for the values at risk.
* _____
* _____
* _____

Acceptable minimum tools

* water bucket drops
* use of fugitive retardant in areas where water drops will not be as effective
* Type II or III helicopters preferred
* chainsaws – consider cross cut saws in Mexican Spotted Owl Core areas
* pumps
* foam and water additives
* _____
* _____

My agency advisor will be the Park Fire Management Officer Chuck Scott.

Provide maximum training opportunities for the National Park Service, Interagency Fire Use Management Team, and cooperators to increase organizational effectiveness.

Minimum disruption of visitor access to the Park trails into the Saguaro Wilderness.

Contain escapes or spots as efficiently as possible - acreage is not a controlling factor.

_____
Superintendent
Saguaro National Park

Appendix IX. Wildland and Prescribed Fire Management Policy Implementation Procedures Reference Guide

Insert CD Here

Appendix X. 5- Year Burn Plan

This document describes the park's prescribed fire operations program for the next 5 years. Delays in project approvals, wildland fire impacts or other factors could require modification of this schedule.

Other projects that will be occurring to coincide with successful completion of our prescribed burn efforts will be:

- Installing Fire Effects Plots in first entry burn units as needed in order to assess fuel loading reduction objectives and other related fire effects objectives.
- Re- reading Fire Effects Plots in 2nd entry burn units to assess whether burn objectives are being met.
- Tracking fuel moisture conditions for prescribed fire operations and preparedness planning.

Burn Unit Priority Analysis:
Burn unit execution priorities may shift throughout the life of this plan. The park's program is ambitious and there are limits to the number of units and amount of acres that can be burned. The largest impact and limiting factor affecting prescribed fire operations is annual fire workload, (wildland fire and prescribed fire). Other limiting factors are seasonal weather, drought, preparedness levels, and funding.

The Fire Management Office will continually analyze the park's manageable fire load based on the following factors:

- Are there constraints dictated by regional and national preparedness levels?
- Will the fire meet hazard fuel reduction and/or natural resources management goals?
- Will the fire cause excessive fire personnel workload and fatigue, which could result in poor decisions with accompanying increases in risks to personnel?
- What is the likelihood of the prescribed fire escaping control?
- Will there be adequate availability of contingency resources?
- Will there be project (burn unit) funding available?

Overall park burning priorities are established in this document as a guide to facilitate the most efficient use of resources, and burn unit execution scheduling, in order to accomplish hazard fuels reduction and ecosystem restoration and maintenance in the areas at highest risk. The outside observer should keep in mind that dozens of variables must be considered continuously throughout the course of the fire season in order to realistically forecast burn units that can be successfully completed.

Prescribed Burn Unit Priority Order:

#	UNIT NAME	SIZE (acres)	SEASON	NOTES
1	Saddle	2000	Summer, fall ok ('05)	1st Entry
2	East Slope	400	Fall ('06)	1st Entry
3	Chimenea	2000	Summer, fall ok ('07)	2nd Entry
4	North Slope	3000	Fall ('08)	2nd Entry
5	Rincon Peak	4000	Summer, fall ok ('09)	1st Entry

Burn Unit Descriptions:

1. **Saddle Burn Unit** - 2005
   Project Number 0001
   Purpose: 1st Entry Burn. Restore ponderosa pine and pine/oak forest condition to within the natural range of variability and reduce the risk of catastrophic stand replacing fire occurring over a large area. Restore fire for ecosystem management reasons. Place area into a re- burn schedule that approximates the natural fire cycle in order to maintain reduced fuels and a more natural ecosystem structure. Portions of this unit may be managed with natural fire after hazard fuels are reduced with prescribed fire.
   Predominant Vegetation Types: Ponderosa Pine, oak woodland
   Location: Rincon Mountain District. Southwest slope of Mica Mountain, from area south of Devil's Bathtub Spring, west of trail to Happy Valley Lookout.
   Latitude: 32° 11', *Longitude*: 110° 32'
   Township 14S, *Range* 17E and *Range* 18E, sec. 25,26,35,36/30,31,32
   Elevation Range: 6,000' to 7,600'
   Aspect: South and West
   Condition Class:2
   Activities: Understory Burn
   Compliance Issues: leopard frogs, drainages
   Smoke Sensitive Areas: Tucson Basin, Manning Camp, Rincon Valley, Park HQ
   Planned Acres: 2000
   Planned Dates: start→ June; end→ October
   Smoke Emissions: Veg. Type – Ponderosa Pine, pine/oak woodland
   Estimated tons per Acre –
   Planned tons per acre consumption -

2. **East Slope Burn Unit**
   Project Number 0002
   Purpose: Historically this area has seen more fire than most areas in the park according to the Park's fire atlas. At this time, this area has not had fire in it since 1994. Parts of this unit are habitat for MSO's as well as Peregrine falcons. Located within the unit is a well established aspen stand which has been maintained historically by fire. Restoring fire into this area after 11 years of fire exclusion will closely mimic the occurrence seen in the fire atlas. This will reduce fuel buildup, decrease erosion and sedimentation impacts, and maintain the aspen stand. By reducing the fuel load and some of the smaller diameter

trees, the chance for a catastrophic fire will decrease eventually allowing for managers to use managed wildland fire here.
Predominant Vegetation Types: Mixed conifer, Douglas fir, Aspen and Ponderosa Pine
Location: Rincon Mountain District. East slope of Mica Mountain, from Fire Loop Trail at Mica 2ndary to Reef Rock down the east slope.
Latitude: 32° 12', *Longitude*: 110° 31'
Township 14S, *Range* 18E, sec. 17, 18
Elevation Range: 7,600' to 8,400'
Aspect: East
Condition Class: 3
Activities: Understory Burn
Compliance Issues: Mexican spotted owl
Smoke Sensitive Areas: Tucson Basin, Manning Camp, Rincon Valley, Park HQ
Planned Acres: 400
Planned Dates: start→ September; end→ October
Smoke Emissions: Veg. Type – Mixed conifer, Douglas fir, aspen
Estimated tons per Acre –
Planned tons per acre consumption -

3. **Chimenea Burn Unit**
Project Number 0003
Purpose: 2nd Entry Burn. Maintain healthy ponderosa pine and pine- oak forest. Provide quality Mexican Spotted Owl habitat. Restore fire for ecosystem management reasons. Place area into a re- burn schedule that approximates the natural fire cycle in order to maintain reduced fuels and a more natural ecosystem structure. Portions of this unit may be managed with natural fire after hazard fuels are reduced with prescribed fire.
Predominant Vegetation Types: Ponderosa Pine
Location: Rincon Mountain District. Area west of Manning Cabin and encompassed by Cow Head Saddle Trail on the north side, and Manning Camp Trail on the south side. Grass Shack will serve as the western most boundary.
Latitude: 32° 12', *Longitude*: 110° 34'
Township 14S, *Range* 17E, sec. 13,14,22,23,24,27
Elevation Range: 5,600' to 8,000'
Aspect: South and West
Condition Class: 2
Activities: Understory Burn
Compliance Issues: Mexican spotted owl, leopard frogs, and drainages
Smoke Sensitive Areas: Tucson Basin, Manning Camp, Rincon Valley, Park HQ
Planned Acres: 2000
Planned Dates: start→ June; end→ October
Smoke Emissions: Veg. Type – Ponderosa Pine, pine oak woodland
Estimated tons per Acre –
Planned tons per acre consumption –

4. **North Slope Burn Unit**

Project Number 0004

Purpose: This unit was burned in the 2003 Helens2 wildfire. Active fire suppression over the last century caused a buildup of fuels to above normal loads of over 44 tons/acre. Severity maps show that a high percentage of the area burned intensely with many trees and shrubs being killed. Tree ring analysis show a fire frequency prior to the 1900's of ever 9.9 years in the mixed conifer type of Mica Mountain. This type is the primary habitat for MSO's in the Rincon Mountains. This second entry burn would be used primarily as a way to reduce the dead and down fuel loading that will occur over the next several years from the Helens2 wildfire. By using fire in this area we will reduce fuel loads which will reduce the chance for a catastrophic wildland fire that would have the potential to destroy MSO nesting sites as well as cause increased amounts of erosion and sedimentation, which can affect tinajas which are critical for the survival of many species in the Sonoran desert. By using fire in an ecologically appropriate manner such as this, this area will eventually be able to safely accept managed wildland fire.

Predominant Vegetation Types: Mixed conifer, Douglas fir, and Ponderosa Pine

Location: Rincon Mountain District. North slope of Mica Mountain, from top of Mica Mountain to northern boundary of park. Burn will be conducted with cooperation of Coronado National Forest.

Latitude: 32° 13', *Longitude*: 110° 33'

Township 14S, *Range* 17E and *Range* 18E, sec. 1,2,3,10,11,12,13,14,15/6,7,18

Elevation Range: 4,600' to 8,666'

Aspect: North

Condition Class:3

Activities: Understory Burn

Compliance Issues: Mexican spotted owl, leopard frogs

Smoke Sensitive Areas: Tucson Basin, Manning Camp, Rincon Valley, Park HQ

Planned Acres: 4400

Planned Dates: start→ September; end→ November

Smoke Emissions: Veg. Type – Ponderosa Pine

Estimated tons per Acre –

Planned tons per acre consumption –

5. **Rincon Peak**

Project Number 0005

Purpose: This unit was burned in the 1988 with the Sunset Fire (Wildland Fire Use) on the southwestern slope of Rincon Mountain. Active fire suppression over the last century caused a buildup of fuels to above normal loads of over 44 tons/acre. Severity maps show that a high percentage of the area burned intensely with many trees and shrubs being killed. Tree ring analysis show a fire frequency prior to the 1900's of ever 9.9 years in the mixed conifer type of the Rincon Mountains. This type is the primary habitat for MSO's in the Rincon Mountains. By using fire in this area we will reduce fuel loads which will reduce the chance for a catastrophic wildland fire that would have the potential to destroy MSO nesting sites as well as cause increased amounts of erosion and sedimentation, which can affect tinajas which are critical for the survival of many species in the Sonoran

desert. By using fire in an ecologically appropriate manner such as this, this area will eventually be able to safely accept managed wildland fire.

Predominant Vegetation Types: Mixed conifer, Douglas fir, and Ponderosa Pine
Location: Rincon Mountain District. Top of Rincon Peak and area down slope on all sides.
Latitude: 32° 13', *Longitude*: 110° 33'
Township 14S, *Range* 17E and *Range* 18E, sec. 1,2,3,10,11,12,13,14,15/6,7,18
Elevation Range: 4,600' to 8,400'
Aspect: North
Condition Class:3
Activities: Understory Burn
Compliance Issues: Mexican spotted owl
Smoke Sensitive Areas: Tucson Basin, Benson, Vail, and Interstate 10
Planned Acres: 4000
Planned Dates: start→ September; end→ November
Smoke Emissions: Veg. Type – Ponderosa Pine
Estimated tons per Acre –
Planned tons per acre consumption –

Appendix XI. Agreements

INTERAGENCY AGREEMENT
BETWEEN
NATIONAL PARK SERVICE
SAGUARO NATIONAL PARK, CHIRICAHUA NATIONAL MONUMENT
FORT BOWIE NATIONAL HISTORIC SITE, CORONADO NATIONAL MONUMENT
TUMACACORI NATIONAL HISTORIC PARK AND
ORGAN PIPE CACTUS NATIONAL MONUMENT
AND
UNITED STATES FOREST SERVICE
CORONADO NATIONAL FOREST

ARTICLE I: Background and Objectives

1. The National Park Service - Saguaro National Park, Chiricahua National Monument, Fort Bowie National Historic Site, Coronado National Monument, Tumacacori National Historic Park and Organ Pipe Cactus National Monument, hereinafter "NPS" and the United States Forest Service, Coronado National Forest, hereinafter "Forest" wish to carry out mutually beneficial wildland fire management actions on those lands near their common boundary.

2. This Agreement is entered into under the authority of the Reciprocal Fire Protection Act, 42 U.S.C. 1856a and the Economy Act of 1932, 31 U.S.C. 1535.

ARTICLE II: Statement of Work

The parties agree as follows:

1. That any fire occurring within one mile of their common boundary will be considered as influencing the lands of the other.

2. That they will cooperate to the fullest extent possible in the management of all fires on both Forest and NPS lands and especially within the confines of the area described in paragraph 1 of Article II. Qualified personnel from either organization will be available for assignment as members of fire suppression crew/teams on Forest or NPS lands.

3. That they will take appropriate suppression action (based on area Fire Management Plans, DO and RM- 18 (Wildland Fire Management Guidelines), Section 5100 of the Forest Service Manual, and existing conditions in the area of the fire)) on all fires occurring within their

jurisdictions as rapidly as possible. When location is in doubt or when requested by the other agency, the suppression action will be made by the agency with the closest available force.

4. That the Initial Attack Incident Commander will remain in charge of the fire until properly relieved by a fully qualified Incident Commander of the same level or higher, as determined by incident qualification card status.

If the relieving Incident Commander is from a different agency than the fire location, the Agency Administrator with jurisdictional authority will issue a *Delegation of Authority* and appoint an Agency Representative to make agency related decisions/recommendations to the Incident Commander.

5. That a unified command will be established for large fires which cross their common boundaries.

6. That fires originating on the lands of one agency and discovered by personnel from the other agency will be reported immediately to the Southeast Arizona Zone Coordinator Center, the Center will notify appropriate personnel for action.

7. That daily fire weather stations will be maintained by both agencies. These weather stations will be in locations and numbers determined by individual agency needs. Weather data will be available on request from either agency. This data may be provided as general weather forecasts, fire weather forecasts (normally broadcast daily by Zone Coordination Center), spot weather forecasts, and general weather records. Requests will be made through dispatchers, incident commanders, prescribed burn bosses, fire behavior officers or those delegated by the preceding individuals.

8. That they will advise each other when aerial detection patrols are ordered for Forest or NPS lands.

9. That fires managed under a Wildland Fire for Resource Benefit Implementation Plan may be allowed on both Forest and NPS lands as specified in Joint Wildland Fire Implementation Plans (WFIP) for specific areas during single incidents.

10. That fires which originate on one agency's land and meet the conditions of that agency will be allowed to burn on the other's land, provided the conditions outlined in the WFIP of that agency are also met.

11. That when fires are burning on lands managed by both agencies, the agencies will assign monitors, as defined by WFIP or other local guidelines, to monitor the portion of the fire burning on their respective lands. The Agencies may, after review of individual qualifications, allow a monitor from one agency to monitor fire(s) on the other.

12. They will make available personnel and equipment to assist with training and execution of prescribed burning projects on each other's lands in accordance with the National Fire Plan, local agreements, and/or guidelines, provided such resources are available.

13. That the Southeast Arizona Zone Coordinator Center will provide the Southeastern Arizona NPS Areas with services including, but not limited to: initial attack dispatching, extended attack dispatching, , processing weather data and providing fire danger rating indices, weather reports (spot, extended, watches and warnings), aircraft flight following, situation reporting, tracking of crew, engine and overhead resources during mobilizations, and other support as identified and agreed to.

14. That they will meet on an annual basis to discuss and exchange information, data and plans regarding common management strategies for the contiguous wilderness areas of the Forest and NPS. The NPS and Forest will develop, as appropriate an annual operating plan outlining specific activities such as PACK Test Administration and issuance of supplies and materials from agency caches. This annual operating plan will be in place not later than March 31st.

15. The Forest will provide all administrative dispatching services for Saguaro National Park from 8:00am to 5:00pm excluding law enforcement dispatch services. Law enforcement dispatch support will be provided through the Phoenix Bureau of Land Management Dispatcher.

ARTICLE III: Term of Agreement

1. This Agreement shall remain in full force and effect for five years from the date of the last signature below. Annual meetings will be held to discuss and resolve any problems that may have arisen concerning implementation of this Agreement.

2. This Agreement may be modified by the mutual written consent of the parties.

ARTICLE IV: Key Officials

The Superintendents of Saguaro National Park, Chiricahua National Monument, Fort Bowie National Historic Site, Coronado National Monument, Tumacacori National Monument and Organ Pipe Cactus National Monument and Coronado National Forest Supervisor shall be the key official for the purposes of this Agreement.

ARTICLE V: Award

Saguaro National Park shall will fund (not to exceed) 10% of the contract cost for the Forest Service helicopter (Tucson) for availability for fire management operations. Additionally, Saguaro National Park will fund $8,500 for management and operations of the Southeast Arizona Zone Coordination Center, Tucson, Arizona. Fund Transfer will be initiated by the Forest using form AD 672 USDA (revised 9/86) no later than May 1st for each year during the

term of this Agreement. Saguaro National Park will establish a Miscellaneous Transaction Document to transfer the funds from a NPS FIREPRO account via OPAC.

ARTICLE VI: Termination

Either party may terminate this Agreement by providing 60 days written notice to the other.

ARTICLE VII: Signatures

IN WITNESS WHEREOF, the parties hereto have executed this Agreement.

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

_____
Superintendent Date
Saguaro National Park

_____
Superintendent Date
Chiricahua/Fort Bowie National
Historic Site

_____
Superintendent Date
Coronado National Memorial

_____
Superintendent Date
Tumacacori National Historic Park

_____
Superintendent Date
Organ Pipe Cactus National Monument

_____
Agreement Officer Date
National Park Service

UNITED STATES DEPARTMENT OF AGRICULTURE
UNITED STATES FOREST SERVICE

_____
Forest Supervisor Date

INTERPARK AGREEMENT
between
Saguaro National Park
and
Casa Grande Ruins National Monument, Coronado National Memorial, Montezuma Castle National Monument, Organ Pipe Cactus National Monument, Tonto National Monument, Tumacacori National Historical Park, and Tuzigoot National Monument

ARTICLE I PURPOSE

The purpose of this agreement is to define the responsibilities of the Saguaro Fire Staff and staff from the other National Park Service Units in Southern Arizona in regards to fire management activities.

Saguaro National Park is assigned eleven permanent fire management positions - fire management officer (pft[3]), fire program assistant (pft), fuels management specialist (pft), fire effects manager (pft), assistant fire effects manager (cs (18/8)[4]), supervisory forestry technician (cs (20/6)), fire use module leader (cs (24/2)), assistant fire use module leader (cs (24/2)), two fire use module crewmembers (cs (18/8)), and packer (cs (13/13)). These positions will be referred to in this document collectively as the "Saguaro Fire Staff". The NPS units are Casa Grande Ruins NM, Coronado NM, Montezuma Castle NM, Organ Pipe Cactus NM, Tonto NM, Tumacacori NHS, and Tuzigoot NM.

ARTICLE II RESPONSIBILITIES

The duties of the Saguaro Fire Staff will include:

- Provide computer services through the shared access computer system - Boise, to any park that desires that service. This would include, but not limited to 1202 Individual Fire Report input; maintenance of individual fire qualifications; maintenance of park master files; and preparation and issuance of incident qualification cards (red cards).

- Coordinate and assist with development of annual FIREPRO budget requests.

- Coordinate and assist with development of annual workplans.

- Assist with review/input for development of fire management plans.

- Assist, as requested, with planning, installation, and reading of fire effects plots for prescribed fire projects.

3 Pft indicates permanent full- time position.
4 Cs (XX/XX) indicates career seasonal position and minimum number of pay periods employed.

- Assist, as requested, with planning and implementation of prescribed fire projects.

- Serve as the conduit for the exchange of fire management information between parks, region, cooperating agencies, and the national office.

- Provide a minimum of one annual site visit to each park by a member of the Saguaro Fire Staff.

- Assist, as requested, in development, coordination, and presentation of fire-related training to meet wildland and prescribed fire needs of the units.

The duties of Southern Arizona Park Units will include:

- Coordinate with Saguaro Fire Staff for requests for service or assistance.

- Identify a Park contact for the Saguaro Fire Staff to better coordinate service and assistance.

- Respond to workplan and budget requests through Saguaro's Fire Management Officer.

- Submit individual fire reports, personnel file updates, situation reports, park master file updates, etc., for input into the shared access computer system.

- Notify the Saguaro Fire Management Officer of any fire restrictions, closures, or fire activity.

ARTICLE III INTERPARK COORDINATION

The Fire Management Officer will coordinate with each superintendent, or designated representative annually to prepare, as determined appropriate, a FIREPRO budget submission and annual work plan for
each unit. The budget submission will be completed not later than 30 June each year. The workplan will be distributed to each unit not later than 30 January each year.

ARTICLE IV FUNDING

All program costs (travel/per diem, communications, supplies & materials, etc.) incurred by the Saguaro Fire Staff will be charged to Saguaro's FIREPRO accounts or accounts designated for individual projects at area units.

ARTICLE V TERM OF AGREEMENT

The term of this Agreement will be five (5) years, beginning with date of signature. It is renewable at the end of each five- year period by written letter or memorandum signed by each of the superintendents.

Amendments to this Agreement can be made at any time subject to the written concurrence and approval of all superintendents.

Superintendents who do not wish to participate in this agreement will not affix their signature and the signature block will be lined out.

ARTICLE VI REPORTS

The Saguaro Fire Staff will supply trip reports within 10- days of any site visit, unless other arrangements have been agreed to.

The FMO will prepare and distribute an annual accomplishment report by the end of December to all superintendents.

Superintendent Date
Saguaro National Park

Superintendent Date
Casa Grande Ruins National Monument

Superintendent Date
Coronado National Memorial

Superintendent Date
Organ Pipe Cactus National Monument

Superintendent Date
Montezuma Castle National Monument
Tuzigoot National Monument

Superintendent Date

Tonto National Monument

Superintendent Date
Tumacacori National Historical Park

SOUTHEAST ARIZONA ZONE CHARTER
(Memorandum of Understanding)

ARTICLE I. Purpose

The Southeast Arizona Zone Board (hereafter referred to as "The Board") is an interagency board with the overall responsibility of coordinating the fire management activities of those agencies represented in the Zone.

Board Composition

One representative from each of the following agency units will serve as Board Members:

Arizona State Land Department, Tucson District,
United States Forest Service, Coronado National Forest
National Park Service, Saguaro National Park
National Park Service, Chiricahua National Monument
Bureau of Land Management, Safford Field Office
Bureau of Indian Affairs, Tohono O'Odham Nation
Bureau of Indian Affairs, San Carlos Agency
United States Fish and Wildlife Service, Buenos Aires National Wildlife Refuge

United States Forest Service, Southeast AZ Zone Coordination Center Manager – non- voting member

Board Members will be assigned, in writing, by and act as representatives for their agency/unit agency administrators. The fire management officer will be the signatory for the Annual Operating Plan. Representatives must have the authority to represent their agency in Board functions. Each agency will have one vote. Six of the eight voting members and/or representatives are needed to conduct business.

ARTICLE II. Responsibilities

The Board is responsible for the selection and management of the Zone Type II Team (this is done in conjunction with White Mountain Zone), nomination of Type I Team candidates, coordination of: training sponsored by the Zone, intra- Zone dispatch channels, Zone prevention programs, Smoke management, prescribed fires, and the management of the Zone Interagency Coordination Center.

1. Manage the Type II Team, in conjunction with White Mountain Zone to include:

   A. Recruitment and selection of team members.
   B. Monitoring and evaluating team performance.

C. Revising team membership as necessary.
D. Providing for development of future team members.
E. Determining team availability for out of zone assignments.

2. Recruit and nominate for personnel to Southwest Area Type I Teams through the Southwest Fire Management Board.

3. Coordinate Zone- sponsored Training.

4. Provide guidance to the Zone Interagency Coordination Center.

5. Coordinate Intra- Zone Dispatch Channels.

6. Review and modify as necessary the Annual Operating Plan.

7. Sponsor Zone Working Teams as appropriate.

8. Coordinate Zone Prevention Program.

9. Zone Chairperson will represent the Southeast Arizona Zone at the Arizona Interagency Coordination Group and the Southwest Fire Management Board Meetings.

10. Coordinate fire restrictions and closures.

11. Coordinate and release public information regarding Zone activities.

12. Notify the Southwest Fire Management Board of Type II Team selection.

13. Set priorities concerning the distribution of critical suppression resources within the Zone.

14. Identify and prioritize incidents within the Zone and relay these priorities to the Southwest Interagency Coordination Center Director or to a Multi- Agency Coordination (MAC) Group.

ARTICLE III. Administration

The Board will meet at least twice a year (October and January/February) to conduct zone business; however, special meetings may be called on any occasion as necessary at the request of any member.

1. Board meetings will be scheduled to allow all agencies to participate. The Zone Chairperson will send a written announcement to all Board Members two weeks prior to scheduled zone meetings.

2. Board members will attend all Board Meetings, or send an alternate.

3. The SEZ Chair will be held for two years with a rotation occurring during the fall meeting of even years.

4. The representative of the next agency in the chair rotation will serve as deputy chairperson, representing The Board in the absence of the Chairperson.

5. The Coronado N.F.- AFMO- Suppression/Prevention will serve as the Zone Training Officer. He/she may have an assistant.

Order of Chair Rotation

Arizona State Land Department
United States Forest Service
National Park Service – will rotate between Saguaro and Chiricahua
Bureau of Land Management
Bureau of Indian Affairs, alternates between Tohono O'Odham and San Carlos Agencies
United States Fish & Wildlife Service

ARTICLE IV. Funding

Costs associated with individual agency travel, per diem, communication, supplies, and equipment will be the responsibility of each agency; unless, other arrangements have been made prior to expenditure of funds.

ARTICLE V. Terms of Agreement

The term of this memorandum of understanding will be five (5) years, beginning after the last date of signature on the agreement. It is renewable at the end of each five- year period by completion of a signature page.

Amendments to this memorandum of understanding can be made at any time subject to the written concurrence and approval of all agencies.

Modification

Modifications within the scope of the instrument shall be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by both parties, prior to any changes being performed. The agencies are not obligated to fund any changes not properly approved in advance.

Access to Records

Give agencies, through any authorized representative, access to and the right to examine all books, papers, or documents related to this instrument.

Termination

Either party(s), in writing, may terminate the instrument in whole, or in part, at any time before the date of expiration. Neither party(s) shall incur any new obligations for the terminated portion of the instrument after the effective date and shall cancel as many obligations as is possible. Full credit shall be allowed for each party's expenses and all noncancellable obligations properly incurred up to the effective date of termination.

Pursuant to Section 22, Title 41, United States Code, no member of, or Delegate to, Congress shall be admitted to any share or part of this instrument, or any benefits that may arise therefrom.

Obligations

Nothing herein shall be considered as obligating the agencies to expand or as involving the United States in any contract or other obligations for the future payment of money in excess of funding approved and made available for payment under this instrument and modifications thereto.

Funding Equipment and Supplies

Federal funding under this instrument is not available for reimbursement of cooperator purchase of equipment (and supplies).

ARTICLE VI. Reports

Reports will be the responsibility of the current Chair.

Signatory pages below are hereby incorporated into this document and made a part hereof.

APPROVAL AND DELEGATION OF AUTHORITY

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate _____ to act on behalf of the Coronado National Forest, USDA Forest Service, as my representative to this group. This designation and authorization shall remain in effect until rescinded.

_____ _____

Date Forest Supervisor
Coronado National Forest
USDA National Forest Service

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate from the Tucson District _____ _____, and to act on behalf of the State of Arizona, State Land Department, State Forester, as my representative to this group. This designation and authorization shall remain in effect until rescinded.

_____ _____

Date Director Fire Management Division
State Land Department
State of Arizona

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate from the San Carlos Agency _____ _____, and from the Papago Agency _____ _____ to act on behalf of the Bureau of Indian Affairs, Phoenix Area, as my representative to this group. This designation and authorization shall remain in effect until rescinded.

_____ _____

Date Regional Director
Bureau of Indian Affairs
Western Regional Office

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate _____ to act on behalf of the Safford District, USDI Bureau of Land Management, as my representative to this group. This designation and authorization shall remain in effect until rescinded.

_____ _____

Date Safford Field Office Manager

USDI Bureau of Land Management

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate _____ to act on behalf of the Southern Arizona Area, USDI National Park Service, as our representative to this group. This designation and authorization shall remain in effect until rescinded.

_____ _____

Date

Superintendent
Saguaro National Park
USDI National Park Service

_____ _____

Date

Superintendent
Tumacacori National Historical Park
USDI National Park Service

_____ _____

Date

Superintendent
Coronado National Memorial
USDI National Park Service

_____ _____

Date

Superintendent
Organ Pipe Cactus National Monument
USDI National Park Service

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate _____ to act on behalf of the Southern Arizona Area, USDI National Park Service, as our representative to this group. This designation and authorization shall remain in effect until rescinded.

_____ _____

Date

Superintendent
Chiricahua National Monument
Fort Bowie National Historic Site
USDI National Park Service

I approve the Memorandum of Agreement establishing the Southeast Zone Board and hereby designate the delegate _____ to act on behalf of USDI Fish and Wildlife Service, as my representative to this group. This designation and authorization shall remain in effect until rescinded.

Date

Regional Director
Buenos Aires NWR
USDI Fish and Wildlife Service

MODIFICATION No.1
To
INTERAGENCY AGREEMENT
Between

US Department of Agriculture, Forest Service
US Department of Interior, Bureau of land Management
US Department of Interior, Bureau of Indian Affairs
US Department of Interior, National Park Service
US Department of Interior, Fish and Wildlife Service
Arizona State Land Department
and the
Arizona Department of Environmental Quality

This **MODIFICATION**, is hereby entered into by and between all of the above listed agencies, as specified under the provisions of Section 5. D. Modification, Agreement No. 98-IA-1 1 031200- 027, executed on July 20, 1998.

The purpose of this Modification is:

1. To allow the extension of the agreement as specified in Section 5.L. for up to five years and seven months. This extension is needed to allow new air quality requirements being adopted by the State of Arizona to be finalized, and to give time to negotiate a new agreement among all parties.

2. To extend the term of the existing Interagency Agreement from June 1,2002 until December 31,2003.

3. To modify the program costs for Fiscal Years 2003 and 2004 as provided for in Section 3. D. 2. G. as follows:

- Department of Agriculture - Arizona National Forests $108,000 ($18,000 for each of 6 Forests)
- Department of Interior - Bureau of land Management 15,000
- Department of Interior - Bureau of Indian Affairs 9,000
- Department of Interior - National Park Service 9,000
- Department of Interior - Fish and Wildlife Service 9,000
- Arizona State Land Department In kind Services
- Arizona Department of Environmental Quality In kind Services

Except as set forth above, all other terms and conditions of the agreement shall remain the same, unchanged, and in full force and effect.

THE PARTIES HERETO have executed this instrument as of the last date shown below.

National Park Service
Intermountain Region

Director_____**Date**

Agreement Number 1443- IA- 12 00- 98- 003

Contracting Officer, Intermountain Region Date

INTERAGENCYAGREEMENT
for
the Air Resource and Interagency Smoke Management Program
of the State of Arizona

1. AUTHORITIES

U.S. Department of Agriculture, Forest Service - Section 5, Act of April 24, 1950 (16 use 572), the Act of June 30, 1914 (16 USC 498), the Act of December 12, 1975 (16 USC 565a- I- 3) and the Annual Department of Interior and Related Agencies Appropriation Act.

U.S. Department of the Interior, Bureau of Land Management - 42 Sta. 857; 16 USC 594, 48 Stat 1270, 43 use 315a, 90 Stat. 2766, 43 use 1737, and Interagency Master Agreement 83- 51 E-0015.

U.S. Department of the Interior, National Parks Service - 16 USC 1b(1), and Interagency agreement 83- 5IE- 0 1 0- IA0475- 3- 8007.

All Federal Land Management Agencies - Reciprocal Fire Protection Act of 1955 (42 use 1856), and Economy Act of June 30, 1932 (31 use 1535) and Interagency Agreement for Fire Management Forest Service # 97- SIA- 004, Bureau of Indian Affairs # POOC141A9871, Bureau of Land Management # 1422- R220A7- 6000, National Park Service # 1443- IA9560-97- 002 and Fish & Wildlife Service # 1448- 93510- 97- H- 504.

State Land Department/State Forester - Arizona Revised Statutes, Section 37- 623.

Department of Environmental Quality - Arizona Revised Statutes, Sections 49- 422.A.2.

2. PURPOSE

The purpose of this agreement is to maintain the current air resource and interagency smoke management program in Arizona. Over the last five years the signatory agencies have found it beneficial and economically efficient to support this program for the following purposes:

- maintaining a liaison between land managers and Arizona Department of Environmental Quality- Air Quality Division (ADEQ- AQD),
- managing smoke from wildland and prescribed fire,
- coordinating burning among land management agencies,
- providing technical support for protection of air affected resources and visibility, providing education and technology transfer related to air resources including smoke management
- having personnel to provide direct technical support for the signatory agencies on air quality and smoke management issues, and

- providing representation in air quality regulation development.

It is planned that fifty percent of the time the program will address interagency statewide smoke management and coordination. The remaining fifty percent of the time, the program will focus on air resource issues for the Arizona National Forests.

3. IMPLEMENTATION

A. Staffing and Supervision: The Air- Resource and Interagency Smoke Management Program will include two full- time positions: an Air Resource Program Manager and an Assistant Manager. The Tonto National Forest (Tonto) will provide one full- time equivalency (FTE) for the manager position while the Bureau of Indian Affairs, Phoenix Area Office will provide one FTE for the assistant position. The Tonto NF will directly supervise the program, coordinate collection and disbursement of funds, and provide other logistical support. The Manager will directly supervise the assistant position.

B. Material Support: The ADEQ- AQD will provide office space, furniture and supplies for two persons; one voice phone line and one analog data phone line per person; one network line and hard/software per person; information/computer system support; clerical support; mail/postage services; maintenance of weather information services; parking accommodations for two vehicles; FAX machine use, and other incidental items and services as needed. This agreement shall supersede the existing Memorandum of Understanding dated January 1992 between the Tonto and ADEQ- AQD.

C. Coordination: The Arizona Interagency Coordinating Group (AICG) will review and approve priorities associated with the Interagency Smoke Management portion of the program on an as- needed basis. Priorities associated with the air resource protection will be reviewed and approved on an as- needed basis by the appropriate representatives of the signatories. Both parties will review and determine annual costs including: salary and benefits for the manager and assistant, training, travel, equipment, and construction.

D. Funding:

For the federal parties to this agreement, this is a Task Order as provided in the Interagency Agreement for Fire Management (see II. Authority). Advanced payment procedures will be utilized.

1. Fiscal Year 1998:

A. Department of Agriculture - Arizona National Forests will fund a total of $81,000 covering all program time spent on Forest Service air resource protection and smoke management activities. Individual National Forest (NF) commitments are: Apache- Sitgreaves NF for $15,000, Coconino NF for $12,000, Coronado NF for $15,000; Kaibab NF for $12,000; Prescott NF for $12,000, and Tonto NF for $15,000.

B. Bureau of Land Management - Arizona State Office will fund a total of $12,000 for support of both smoke management and air resource management activities. National Park Service Intermountain Region will fund $6,000 for support of smoke management activities. Fish and Wildlife
Service – Region 2 will fund $6,000 for support of smoke management activities.

C. Bureau of Indian Affairs - Phoenix Area Office (BIA- PAO) will will cover all costs incurred in Fiscal Year 1998 associated with the assistant position including costs of salary, benefits, transfer costs, advertising, personnel actions, hiring, and other costs *as* incurred.

D. State of Arizona - The Arizona State Land Department (ASL) / Forestry Division will provide in- kind services and aviation support as needed for support of smoke management activities.

E. Upon request, air resource management services can be provided to any participating agencies outside of the Arizona National Forests, however costs will need to be reflected in the annual funding percentage from the requesting agency.

F. In lieu of monetary transfers, other means of meeting a participating agency or unit's funding commitment may be used such *as* supplies, equipment, and/or vehicles, as approved by the AICG and Air Resource Program Manager.

2. Fiscal Year 1999- 2002 on an annual basis:

A. Department of Agriculture - Arizona National Forests will fund a total of $90,000 covering all program time spent on Forest Service air resource protection and smoke management activities. The costs of the program shall be shared equally among National Forests in Arizona. Tonto NF will collect and disburse funds applicable to the support of this program including the costs of the assistant position to the Bureau of Indian Affairs.

B. Bureau of Land Management - Arizona State Office will fund a total of $12,000 for support of both smoke management and air resource management activities. National Park Service Intermountain Region will fund $6,000 for support of smoke management activities. Fish and Wildlife Service - Region 2 will fund $6,000 for support of smoke management activities.

C. Bureau of Indian Affairs - Phoenix Area Office (BIA- PAO) will cover all internal administrative costs incurred associated with the assistant position such as personnel actions. BIA- P AO will fund $6,000 for support of smoke management activities.

D. State of Arizona - The Arizona State Land Department (ASL) / Forestry Division will provide in- kind services and aviation support as needed for support of smoke management activities.

E. Upon request, air resource management services can be provided to any participating agencies outside of the Arizona National Forests, however costs will need to be reflected in the annual funding percentage from the requesting agency.

F. In lieu of monetary transfers, other means of meeting a participating agency or unit's funding commitment may be used such as supplies, equipment, and/or vehicles, as approved by the AICG and Air Resource Program Manager.

G. Annual program costs can be modified from the above by mutual consent of the contributing parties, by issuance of a written modification, signed and dated by the parties affected.

4. TERMS

This agreement shall be in effect from the date approved by all parties' signatures and will terminate in five years from that date. Before expiration, all parties shall review the agreement to determine whether to renew it. Any signatory may withdraw from this agreement by written notice.

5. GENERAL PROVISIONS

A. Administration Standards. All applicable national policy requirements and administrative management standards as set forth in Office of Management and Budget, Financial Management Division, Directory of Policy Requirements and Administrative Standards for Federal Aid Programs are hereby incorporated by reference, including OMB Circular A- I 02, OMB Circular A - 78, and OMB Circular A - 128.

B. Restriction for Delegates. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

C. Project Descriptions. When issuing statements, press release, request for proposals, bid solicitations, and other documents describing projects or programs funded in whole or in part with Federal money, all recipients receiving federal funds, including both limited to state and local governments, shall clearly state (1) the percentage the total cost of the program or project which will be financed with federal money, and (2) the dollar amount of federal funds for the project or program.

D. Modification. Modifications within the scope of the instrument shall be made by mutual consent of the parties, by the issuance of a written modification, signed and dated by the parties, prior to any changes being performed. The parties to this instrument are not obligated to fund any changes not properly approved in advance.

E. Access to Records. Give the Comptroller General or any agency party to this instrument, through any authorized representative, access to and the right to examine all books, papers, or documents related to this instrument.

F. Termination. Any party(s), in writing, may terminate the instrument in whole, or in part, at any time before the date of expiration. Neither party(s) shall incur any new obligations for the terminated portion of the instrument after the effective date and shall cancel as many obligations as is possible. Full credit shall be allowed for each parties expenses and all noncancellable obligations properly incurred up to the effective date of termination.

G. Obligations. Nothing herein shall be considered as obligating the parties of this instrument to expend or as involving the United States in any contract or other obligations for the future payment of money in excess of funding approved and made available for payment under this instrument and modifications thereto.

H. Completion Date. This instrument is executed as of the last date shown below and expires on June 1, 2002, at which time it will be subject to review, renewal, or expiration.

I. Principal Contacts. The principal contacts for this instrument are:

Richard Martin
USDA Forest Service
Tonto National Forest
2324 East McDowell Road
(602) 225- 5200

John Philbin
Bureau of Indian Affairs
Phoenix Area Office
Post Office Box 10
(602) 379- 6798

Al Alvarez
Bureau of Land Management
Arizona State Office
222 N. Central Avenue
(602) 417- 9309

Chuck Scott
National Park Service
Saguaro National Park
3693. S. Old Spanish Trail
Tucson, AZ 85730
(520)733- 5130

Mike Phillips
Fish and Wildlife Service
Southwestern Regional Office
500 Gold Ave SW
Albuquerque, NM 87103
(505)248- 6819

Kirk Rowdabaugh
Arizona State Land Dept
Fire Management Division
2901 W. Pinnacle Peak Rd
Phoenix , AZ 85027
(602)255- 4059

Nancy Wrona
Arizona Dept. of Environmental Quality
Air Quality Division
3033 N. Central Avenue
Phoenix, AZ 85012
(602)207- 2316

Peter Lahm
USDA Forest Service
c/o ADEQ- AQD
3033 N. Central Avenue
Phoenix, AZ 85012
(602)207- 2356

J. Billing. Transfer of funds to and from the participating agencies will be through an On- Line Payment and Collection System (OPAC) billing. The OPAC billing document which the participating agency will prepare shall contain the following information as the first line of the description or the reference section:

Participating Agency Account Data - (Insert Reg. Code. Unit code)

Management Code – (Insert Mgmt. Code)
Instrument No. – (Insert Inst. No.)
Agency Location Code – (Insert ALC No.)
Budget Object Code - 0 (Insert BOC)

Send bill to: National Finance Center, ATTN: OP AC
P.G. Box 60000
New Orleans, LA 70160

A detailed list of charges incurred will be made available upon request. Any excess funds not used for the agreed costs shall be refunded to the cooperator on an annual basis.

K. Availability of Funds. The parties to the instrument obligation for performance of this instrument beyond this date is contingent upon the availability of appropriated funds from which payment can be made. No legal liability on the part of the participating agencies for any payment may arise for performance under this instrument beyond June 1. 2002, until funds are made available to the agencies for performance and until it receives notice of availability. Contingent
upon participating agencies approval of continence of work, a written modification to the instrument shall be issued to include funding for the subsequent performance period as described in the approved operating or financial plan, or budget.

L. Extend Term. The participating agencies, by written modification to the instrument, may extend the term for subsequent performance periods not to exceed a total duration of 5 years from the execution date of the instrument, including the subsequent performance periods.

6. **PARTICIPATING AGENCIES**

- USDA FOREST SERVICE
  APACHE – SITGREAVES NATIONAL FOREST

  _____
  FOREST SUPERVISOR DATE

- USDA FOREST SERVICE
  COCONINO NATIONAL FOREST

  _____
  FOREST SUPERVISOR DATE

- USDA FOREST SERVICE
  CORONADO NATIONAL FOREST

  _____

FOREST SUPERVISOR DATE

- USDA FOREST SERVICE
  KAIBAB NATIONAL FOREST

_____

FOREST SUPERVISOR DATE

- USDA FOREST SERVICE
  PRESCOTT NATIONAL FOREST

_____

FOREST SUPERVISOR DATE

- USDA FOREST SERVICE
  TONTO NATIONAL FOREST

_____

FOREST SUPERVISOR DATE

- USDI, BUREAU OF LAND MANAGEMENT
  ARIZONA STATE OFFICE

_____

DIRECTOR DATE

- USDI, BUREAU OF INDIAN AFFAIRS
  PHOENIX AREA OFFICE

_____

FOREST SUPERVISOR DATE

- USDI, BUREAU OF INDIAN AFFAIRS
  WESTERN REGIONAL OFFICE

_____

CONTRACTING OFFICER DATE

- USDI NATIONAL PARK SERVICE
  INTERMOUNTAIN REGION

_____

DIRECTOR DATE

- USDI, FISH AND WILDLIFE SERVICE

_____

REGIONAL DIRECTOR DATE

- ARIZONA STATE LAND DEPARTMENT

_____

STATE FORESTER DATE

- ARIZONA DEPARTMENT OF ENVIRONMENT QUALITY

_____

DIRECTOR DATE